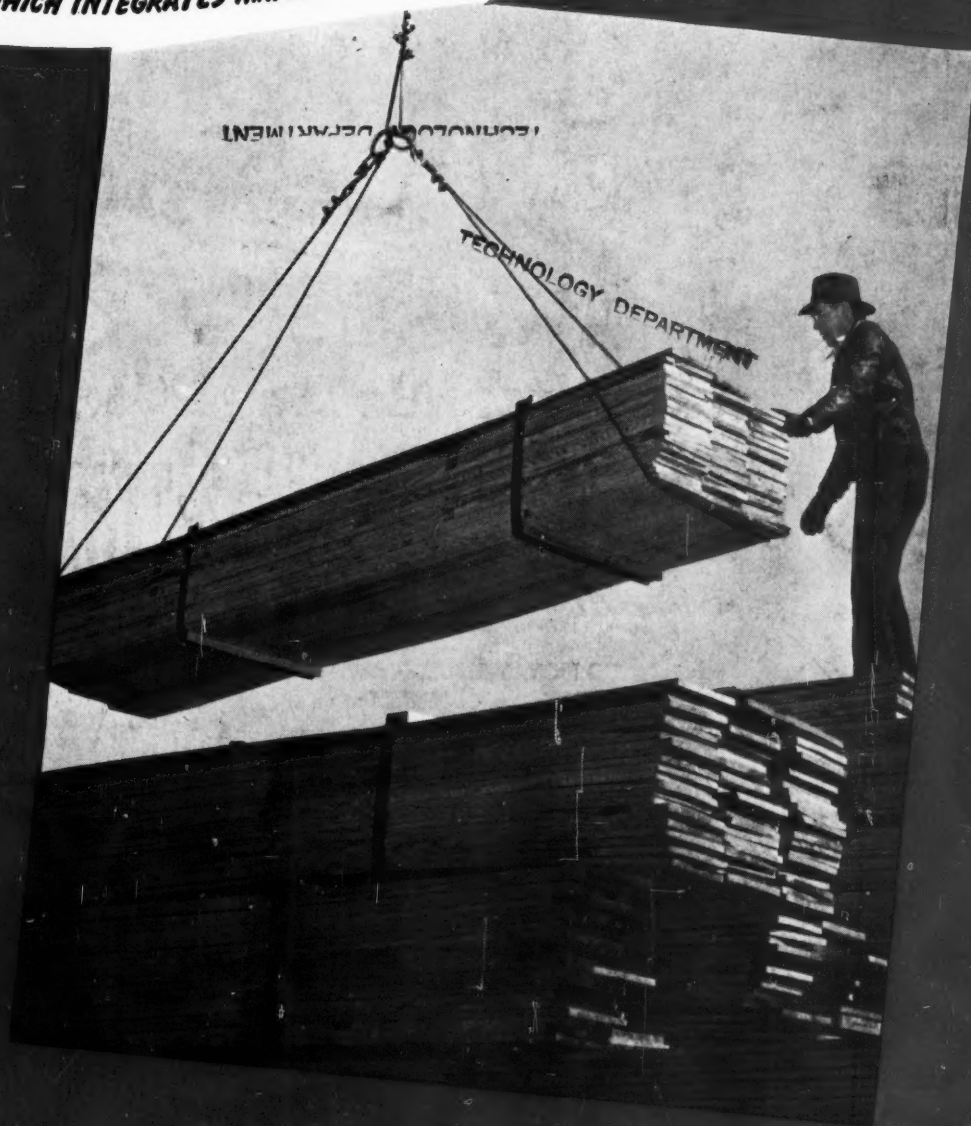


Flow

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DETROIT

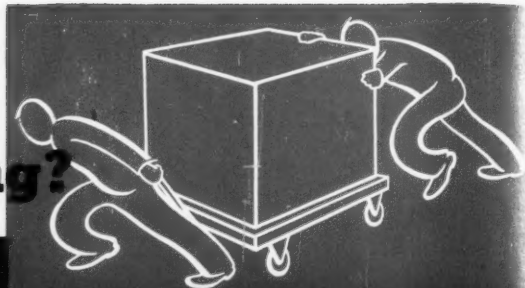
... THE MAGAZINE WHICH INTEGRATES MATERIAL HANDLING EQUIPMENT INTO THE FLOW OF PRODUCTION

JULY
1947



A New Section "Packaging Mechanics" starts in this issue. See page 29

Can You Afford the High Cost of Push-and-Pull Hauling?



\$775⁰⁰

F. O. B. JACKSON



Users get 8 hours of continuous operation per gallon of gas.



Truck-Man turns in its own length!



9 out of 10 of all shop loads are LESS than 1 TON.

Thousands Have Switched to **truck-man** for Low-Cost Hauling

HERE'S HOW TRUCK-MAN SAVES YOU TIME AND MONEY:

- Truck-man lifts and hustles skidded loads up to 2000 lbs. — without starting or dropping shocks — safely, easily, quickly . . .
- Turns in 360° — snakes into holes its own length — increases usable floor space . . .
- Grouped controls speed and simplify operation — anyone can operate without fatigue . . .
- Speeds briskly on straightaways

— creeps in narrow aisles and close squeezes . . .

• Drives on big DUAL pneumatic-tired wheels for traction and easy riding. Heavy solids carry the load . . .

• Stands the gaff — tireless, day in, day out! Maintenance and running costs are negligible. TRUCK-MAN is ECONOMICAL TO OWN, EASY TO BUY!

IF TIME AND MONEY MEAN ANYTHING TO YOU, get the FACTS on TRUCK-MAN. Write now for new Model D folder.

Sixty-five Truck-Man distributors in principal centers provide standard service.

truck-man INC.

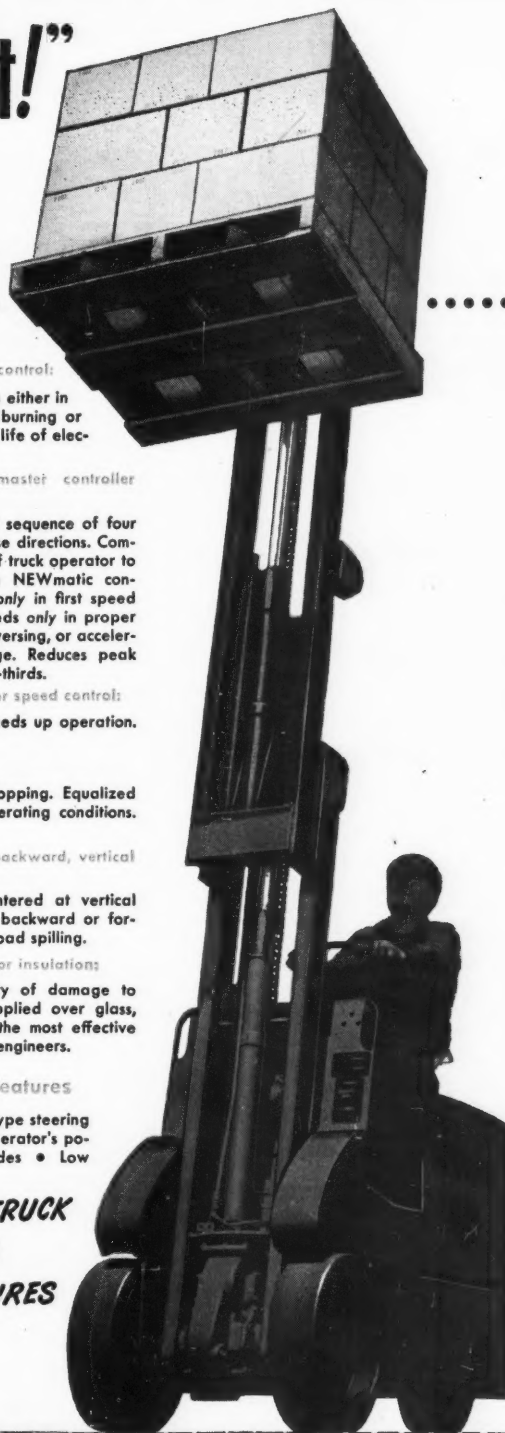
1418 West Ganson

Jackson, Mich.

Skylift Wins on "Point Test!"

COMPARISON PROVES

Feature for feature Skylift Outpoints All Other Fork Trucks



1 The only hydraulic electric truck with automotive type controls:

Operates like a car—anyone who has driven an automobile, can operate the Skylift!

2 Single operating handle for lift and tilt control:

Simplicity of control. Lever, just below steering wheel similar to gearshift lever on newer model cars. Speeds operation—reduces operator fatigue.

3 Can lift, tilt and drive simultaneously or independently under all load conditions:

Speeds operation. Provides easier and faster spotting of loads since lifting and tilting can be accomplished while Skylift is in motion.

4 Forks elevate full height of first lift without increasing overall height:

Forks and uprights move independently to give you full 67 inch single lift before increasing upright height beyond standard 83 inches. Stack to ceiling height in low clearance buildings and boxcars without uprights extending above load.

5 Automatically controlled pre-set lowering speed:

Eliminates possibility of damage to load caused by excessive lowering speeds. No danger of load dropping violently.

6 130" lift with 83" collapsed height of uprights:

Highest lift on any fork truck with standard 83" overall collapsed height of uprights. Higher storage possible, still truck will pass through standard 7 foot high door.

7 Dual chains are load equalized and fully compensated:

Safety—longer chain life. 2 separate chains are used instead of double width chain. Each chain has sufficient capacity to hold load.

8 Fork carriage equipped with special design thrust rollers:

Prevents upright spreading. Also if off center loads are handled, fork carriage will not twist.

9 Reversible drive wheels:

Off center mounting provides increased overall width dimension when drive wheels are reversed ... greater stability on rough or uneven runways.

10 All wheels demountable without disrupting wheel bearing adjustment:

When wheels are removed for tire replacement, bearing alignment cannot be disturbed.

11 Full magnetic contactor control:

Foolproof operation—Truck is either in speed or out of speed. No burning or arcing in controller. Increases life of electrical equipment.

Automatically timed master controller

12 (NEWmatic):

Provides automatically timed sequence of four speeds in forward and reverse directions. Completely eliminates tendency of truck operator to start in higher speed, since NEWmatic controller allows truck to start only in first speed and pass through faster speeds only in proper sequence. Smooth starting, reversing, or accelerating eliminates tire slippage. Reduces peak electric current surges by two-thirds.

13 Foot accelerator pedal for speed control:

Automotive type control—speeds up operation. Simplicity.

14 Disc type brake:

Smoother, easier, positive stopping. Equalized braking power under all operating conditions. Self-aligning for long life.

15 Automatic tilt stops in backward, vertical and forward positions:

Safety. Uprights always centered at vertical position when moving either backward or forward. Reduces possibility of load spilling.

16 Silicone Varnish for motor insulation:

Virtually eliminates possibility of damage to motors from overheating. Applied over glass, mica, or asbestos, it is thus the most effective insulation known to electrical engineers.

Plus These All-Star Features

Dead-man control • Caster-type steering axle • Center control • Operator's position accessible from both sides • Low center of gravity.

**NO OTHER FORK TRUCK
HAS THESE 16
EXCLUSIVE FEATURES**



ONLY AUTOMATIC MAKES THE FAMOUS SKYLIFT
ELECTRIC TRUCKS, TRANSPORTERS AND TRANSTACKERS

Send Coupon for "POINT-TEST" Proof of Material Handling Savings

AUTOMATIC TRANSPORTATION COMPANY

DIV. OF THE YALE & TOWNE MFG. CO.
141 W. 67th St., Dept. K-7, Chicago 20, Ill.

- ☐ Please send me "POINT-TEST" Proof of Skylift material handling superiorities.
☐ Have an ATCO Specialist make a free survey of my material handling costs.
☐ Schedule me for a showing of ATCO's new film, "Pay Loads Pay Off."

Company Name.....

By.....

Street Address.....

City.....State.....

This space isn't wasted if
you read the facts on batteries
on the opposite page...



Your Electric Truck is no better than YOUR BATTERY

There is no better battery than a . . .

GOULD

Due to the large increase in the electrical truck demand, Gould engineers have developed a special battery to meet all requirements of the electric truck; these batteries cost money, but you can't afford not to have the best. Buy a Gould and compare it with any other well known battery. Give it your own tests, then you be the judge.

A battery must have balanced power—that is where Twin Power counts. The Gould positive and negative plates are in perfect balance. This, with proper space for acid and with a glass mat retaining all active material in place until

spent, when added up gives you your answer.

It is claimed that Gould has the finest battery research laboratory in the world. When in the Buffalo area stop and see for yourself. Telephone Madison 1013 and we will be glad to pick you up and show you where your batteries are engineered.

During the war the government requirements were most rigid, but Gould met them all with the same engineers that have engineered our industrial truck battery. Get a Gould battery powered electric truck and get the best.

1947 • GOULD'S FIFTIETH YEAR • 1947

GOULD STORAGE BATTERY CORPORATION • Depew, N. Y.

GOULD



KATHANODE

BATTERIES

Service Centers: Boston, Mass. • Chicago Heights, Ill.
Cincinnati, Ohio • Cleveland, Ohio • Depew, N.Y.
Detroit, Mich. • East Point, Ga. • Los Angeles, Cal.
New York, N.Y. • Pittsburgh, Pa. • St. Louis, Mo.
St. Paul, Minn. • San Francisco, Cal. • West Salem,
Ore. • Zanesville, Ohio • Kingston, Ont., Canada

JULY, 1947



Cost-cutting Take a stroll with 3 Tons...

Now you can achieve greater ease of material handling and economy than ever before. Use the WORKSAVER Electric Lift Truck. This modern, cost-cutting production tool does a complete job—lifts by electric power, travels by electric power. It reduces material handling to little more than a strolling and steering operation.

With a WORKSAVER you can pick up and "walk off" with loads up to 3 tons. It has two safe forward and reverse speeds with finger-tip control. Compactly built, the WORKSAVER can be maneuvered easily in congested areas, along narrow passages and around sharp corners.

Let the WORKSAVER wipe out delays, conserve energy, cut production costs—for you. It is available in the six models indicated at the right. Send today for full details. Address: Yale & Towne Mfg. Co., 4530 Tacony St., Phila. 24, Pa.



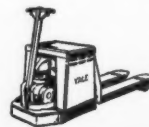
AVAILABLE IN 6 MODELS

Low Lift Platform
High Lift Platform
Pallet • High Lift Fork
Tractor • Tin Plate



WORKSAVER *Electric Lift Trucks*

CUT PRODUCTION COSTS... SAVE TIME... SAVE EFFORT... PROMOTE SAFETY



KRON INDUSTRIAL SCALES • HOISTS—HAND AND ELECTRIC • TRUCKS—HAND LIFT AND ELECTRIC



For Assured Dependability...Use

MALLORY

RECTOTRUCK

(Trademark)

Chargers

The Only Chargers with the Unbeatable Combination of

MALLORY and Exide

Magnesium Copper Sulphide Rectifier

TVR Voltage Relay
(Reg. U.S. Pat. Off.)

MALLORY Rectotruck Chargers designed in collaboration with the leading storage battery and truck manufacturers provide:

Fully automatic operation • Optimum charging characteristics of either lead or Edison battery • Maximum battery life • Completely trouble-free operation • Maximum service life • Minimum maintenance—ventilating fan is only rotating part.

Mallory Rectotruck Chargers assure safe, automatic charging of either lead or Edison batteries, in minimum time. Adaptable to either 115 or 230 volt power lines, the chargers will accommodate wide variations in line voltage and battery requirements. You need not remove the batteries from your truck in order to charge them; merely connect charger to battery—turn the knob.

Mallory Rectotruck Chargers are easy to install. They are compact in size, light in weight and easily transportable. They can be located anywhere near your trucking activity and moved when you move your working center.

Mallory Chargers are available in three models, usually from stock, for charging any electric lift truck battery: Eight hours for lead batteries and seven hours for Edison batteries (see chart). Other models are available for

Most rugged, dependable rectifier for low-voltage, high-current applications.

Unaffected by high temperature operation under adverse atmospheric conditions.

Phenomenal ability to withstand abuse and accidental short circuits.

Stable, consistent charging without adjustment over long life.

Minimum maintenance—no brushes, bulbs, sparking contacts.

Precision temperature-compensated voltage relay.

Exclusive, patented inverse temperature compensating feature.

Operates during the rapid rise in the charging voltage characteristic of a lead battery.

Reduces high initial charging rate to low safe finishing rate.

Starts synchronous timer which controls length of time at finishing rate.

Approved by leading lead battery manufacturers.

charging standard truck batteries. All chargers are competitively priced. No "accessories" or "extras" are required.

For ever-ready lift truck service you need reliable battery chargers. For assured dependability you need Mallory Rectotruck Chargers—available from your electric lift truck agent through

Automatic Transportation Co.
Barrett-Cravens Co.
Lewis-Shepard Products, Inc.

Lift Trucks, Inc.
The Moto Truc Co.
The Yale & Towne Mfg. Co.
Philadelphia Division

Rectifier Charger Pioneers Since 1927

Mallory Charger Model	Battery Ampere Hour Rating	
	6 Cell Lead	10 Cell Edison
12TC60-1	150-330	150-263
12TC75-1	340-440	281-338
12TC110-1	442-660	375-450

Based on an approximate charge cycle of eight hours for lead batteries, seven hours for Edison batteries.

P. R. MALLORY & CO. Inc.

MALLORY

RECTIFIERS

MAGNESIUM COPPER SULPHIDE RECTIFIERS—
STATIONARY AND PORTABLE D. C. POWER SUPPLIES—
BATTERY CHARGERS AND AVIATION RECTOSTARTERS*

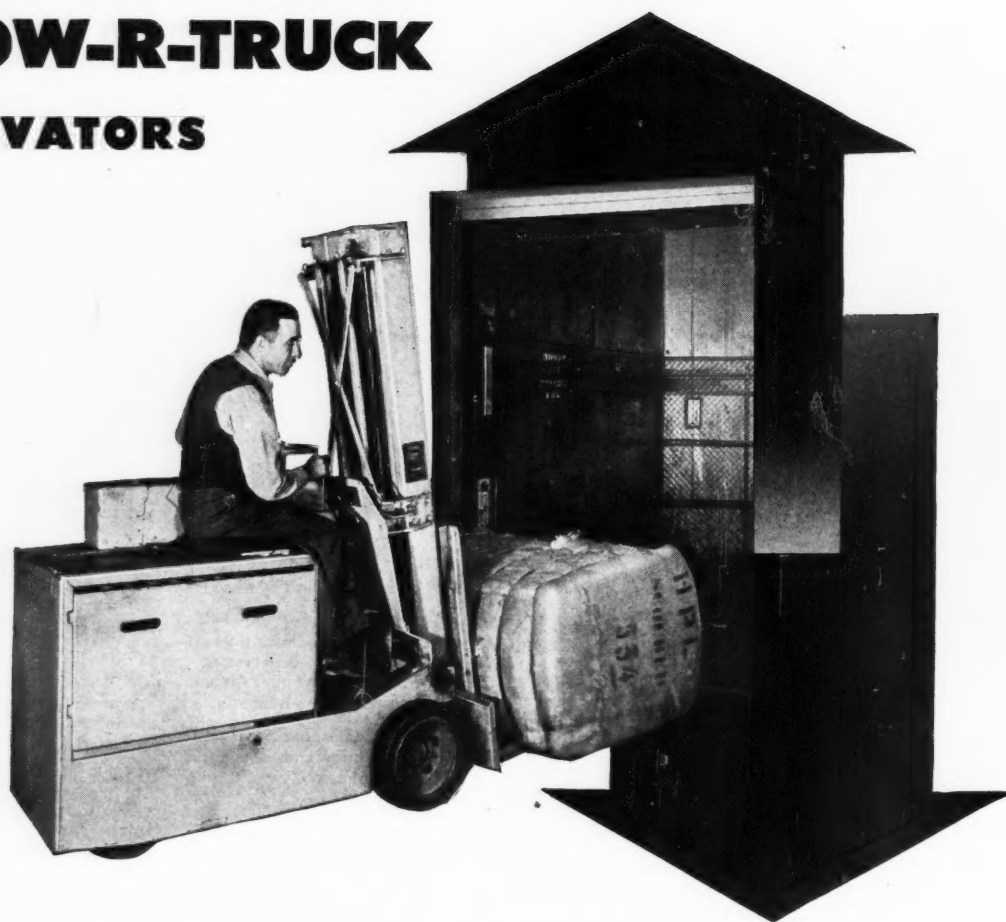
*Reg. U. S. Pat. Off.

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

OTIS

POW-R-TRUCK

ELEVATORS



ADD THE "THIRD DIMENSION" TO POWER TRUCK TRANSPORTATION

Otis **POW-R-TRUCK** elevators add *up-and-down* travel to the many other advantages of power truck-loading!

With a **POW-R-TRUCK** elevator, industrial trucks become completely mobile units—free to go to upper or lower floors—free to take loads directly to destination. With a **POW-R-TRUCK** elevator you lose no time in loading, picking up or re-handling.

POW-R-TRUCK elevators are the world's only standard line of elevators built to:

1. Withstand severest off-balance loading and impact loading.
2. Carry both truck and pay-load safely and swiftly.
3. Suit every size, speed and capacity need.

You get *all* the advantages of power truck and unit-loading, when your trucks can travel vertically as well as horizontally.

POW-R-TRUCK elevators, standardized and made exclusively by Otis, are only slightly higher in cost than conventional freight elevators.

For illustrated folder please write Otis Elevator Company, 260 Eleventh Avenue, New York 1, New York, or call your local Otis office.





"BUT THAT'S ONLY PART OF OUR SAVINGS

WITH *electric* INDUSTRIAL TRUCKS!"

"Granted they cost less—much less—to maintain. That's logical when you count their moving parts . . . none in the battery, one in each motor."

"And we know, on energy cost alone, we save more than sixty per cent."

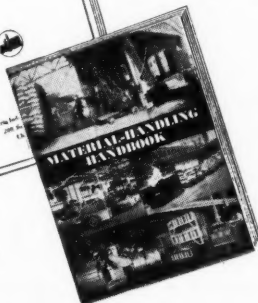
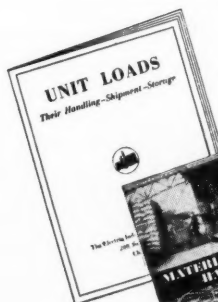
"But the real pay-off comes from their staying on the job, putting material where it's wanted, when it's wanted . . . without added investment in standby equipment. Minutes saved by men and machines on the production line are the big savings that help profits."

That, in a nutshell, typifies the conviction of experienced owners who have found, to their profit, that battery-powered trucks show a unique ability to "stay on the job."

Down time for inspection, maintenance or repair is negligible—so much so that standby truck equipment is unnecessary in many plants.

Is the economy of dependable material-handling, plus lowest operating cost, what you want from industrial trucks—rather than economy in first cost alone?

We believe that it is, for it affects ultimate profits of most business concerns more directly—and more heavily—than does a lower original investment.



SEND FOR
THESE FREE
MANUALS

The MATERIAL-HANDLING HANDBOOK and UNIT LOADS have helped many organizations to plan material-handling savings that go straight to profits. Your letter will bring them, without charge.

THE ELECTRIC INDUSTRIAL TRUCK ASSOCIATION

208-L South La Salle Street • Chicago 4, Illinois

ROUND THE CLOCK POWER



for Industrial Trucks

In hundreds of industries where production schedules require it, battery industrial trucks are working 24 hours a day, day after day, with a regularity that many people thought was impossible until they saw it demonstrated.

Here are some of the reasons: A battery industrial truck employs electric-motor drives which are inherently simple; have few moving parts to require repair. The truck is kept continuously supplied with power by batteries that are exchanged at convenient intervals, usually 8 to 12 hours. Charging and any other service needed by the batteries is performed while they are out of the truck.

It is economical . . .

A battery industrial truck is also economical. Its batteries are charged from low-cost electric power and they apply the power to the job with high efficiency: instant starting; rapid acceleration; no power consumption during stops. These are exactly the power characteristics needed by stop-and-go handling work.

Thus a battery industrial truck is an inherently dependable and economical machine. It is extra dependable and extra economical when powered by EDISON Nickel-Iron-Alkaline Batteries, the batteries that have steel cell construction, a solution that is a natural preservative of steel, and a fool-proof electrochemical principle of operation. The Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Offices in principal cities. In Canada, International Equipment Company, Limited, Montreal and Toronto.

In Industrial Trucks, EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages

They are **durable mechanically**; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.

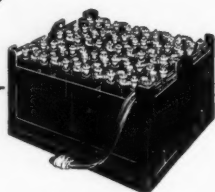
They can be **charged rapidly**; gassing cannot dislodge the active materials.

They **withstand temperature extremes**; are free from freezing hazard; are easily ventilated for rapid cooling.

They are **foolproof electrically**; are not injured by short circuiting, reverse charging or similar accidents.

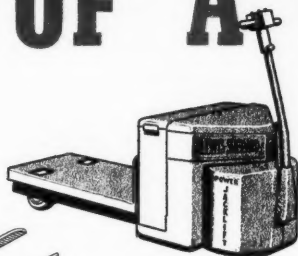
They can **stand idle indefinitely** without injury. Merely discharge, shortcircuit, and store in a clean, dry place.

They are **simple and easy to maintain**.

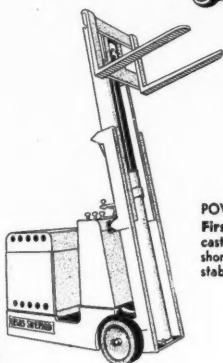


EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

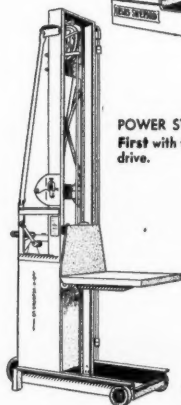
SIGN OF A GREAT LINE



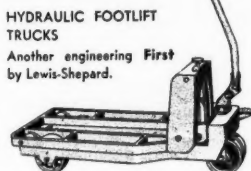
POWER JACKLIFTS
First complete electric operation with handle vertical. First in so many ways — you should see it — First!



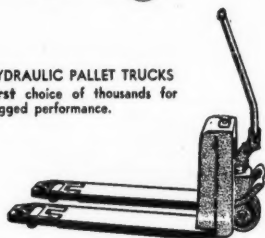
POWER FORK TRUCKS
First with one-piece main frame casting, lowest center of gravity, shortest turning radius, maximum stability, lowest maintenance.



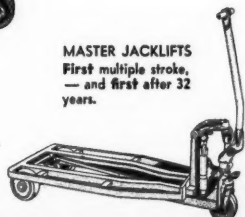
POWER STACKERS
First with the famous L-S worm drive.



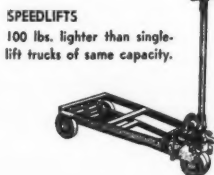
HYDRAULIC FOOTLIFT TRUCKS
Another engineering First by Lewis-Shepard.



HYDRAULIC PALLET TRUCKS
First choice of thousands for rugged performance.



MASTER JACKLIFTS
First multiple stroke, — and first after 32 years.



SPEEDLIFTS
100 lbs. lighter than single-lift trucks of same capacity.



FLOORMASTERS
Popular First, — with arc-welded frame and precision balance.



STORAGE RACKS
Another L-S First, — arc-welded.



SKID PLATFORMS
First arc-welded, steel-bound skid.



Lewis-Shepard Engineers have been producing "FIRSTS" for over 32 years. Always pioneering, always field-testing, — each new design has been an outstanding improvement over those on the market. This unique "Multiply Manpower" Trade Mark (It's a pushover with L-S) is recognized throughout industry as the symbol of the most diversified line of materials handling equipment you can buy.

Write today and be sure to see L-S FIRST!

LEWIS-SHEPARD PRODUCTS, INC. 115 WALNUT STREET
WATERTOWN 72, MASS.
REPRESENTATIVES IN PRINCIPAL CITIES  CONSULT YOUR PHONE DIRECTORY

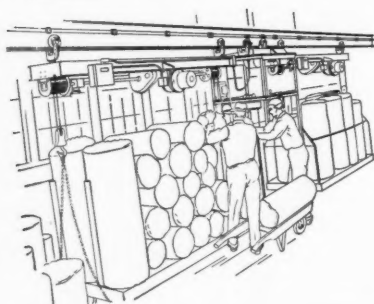
JULY, 1947



8000 lb. loads are transferred by MonoTractor Carrier to shipping platform.

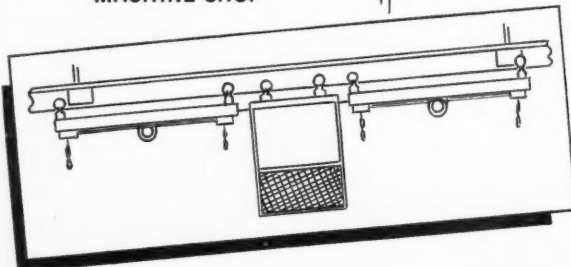
SHIPPING PLATFORM

Floor trucks are lifted by hoists on MonoTractor Carrier.



CLOTH ROOM

MACHINE SHOP



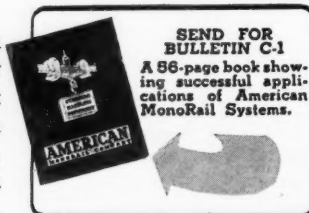
Overhead Transportation with MonoTractor Drive

There are very few limitations connected with American MonoRail Overhead Handling. This installation presented at least two problems — low head room and transfer of heavy materials over large areas and from building to building. The problems were solved by American MonoRail Engineers. The equipment consists of RailMaster Shielded Track, two twin hook hoists, with cab control, propelled by an American MonoTractor.

In operation just a short time, handling costs have already shown a very substantial saving.

Production has increased and manpower formerly used in lifting and hauling materials from one operation to another has been converted to more productive output.

Let an American MonoRail Engineer show you how to cut your overhead with overhead handling. This service is given without obligation.



THE AMERICAN

MONORAIL

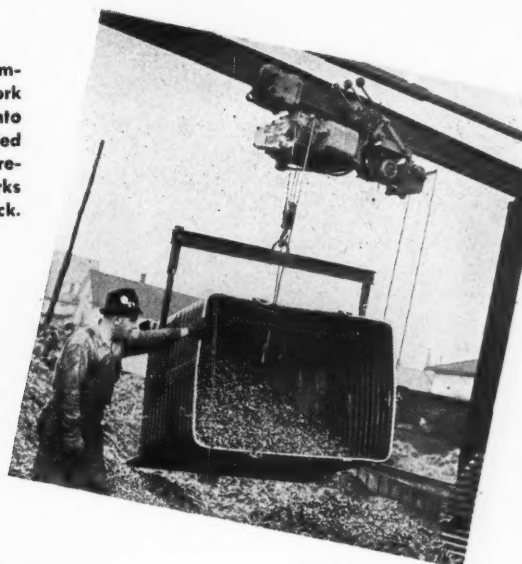
COMPANY

13129 ATHENS AVENUE

CLEVELAND 7, OHIO



Fork-Roll-Over Box completely revolved by fork truck—scrap dumped into truck. Pockets are welded to the Box for receiving the forks of the lift truck.



• Photo shows Crane-Dump Skid Box. Properly located trunnions assure safe, speedy dumping when latch is released.

*Simplify
Speed up
Save on*

DUMPING OPERATIONS

with **UNION METAL** *Engineered*
Materials Handling Equipment

PICTURED on this page are three entirely different types of Union Metal steel boxes . . . developed specifically to simplify, speed and improve the efficiency of dumping materials in production-crowded industrial plants.

Offering you a range of methods broad enough to cover most dumping problems, they are still only examples of the many materials handling units available through Union Metal.

To increase the spread between production cost and selling price, get all the facts. A letter will bring complete information about our entire line of steel boxes, pallets, skids. The Union Metal Manufacturing Company, Canton 5, Ohio.



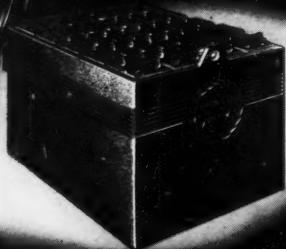
• This Drop-Bottom Dump Skid Box features stop plates under Skid Deck at front end to prevent materials dumping on forks.

UNION METAL
Materials Handling Equipment



Best by far for high-speed production

In today's fast-moving production work the modern battery-powered truck has no equal. The development of modern high capacity batteries by Philco, gives trucks 10 to 20% more additional work energy for steady, full-shift operation. Philco extra capacity types are widely used—XL, XVL, AMH and the famous long-life Philco "Thirty". Write for catalogs of specification data.



PHILCO
STORAGE BATTERIES

PHILCO CORPORATION • STORAGE BATTERY DIVISION • TRENTON 7, NEW JERSEY

Flow

JULY, 1947

COVER PHOTO—Steel-strapped packages of crating lumber, secured with 1¼-inch strapping, are shipped on flat cars, with resultant economies at all handling points. Unloading is done either by mobile crane or fork truck. Saving per car was 83 per cent of former (board-by-board) unloading method. For more on this development see Page 32.

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How do you know you can't save money?



Lead and antimony prices have advanced 100% in the last year. Rubber parts and labor have increased accordingly.

In spite of this, a C & D Battery specialist will show you how to reduce your battery costs as much as 12% . . . by presenting facts and figures on C & D's second talking point: PRICE.

Consistent battery QUALITY is, of course, point number one . . . and Aircool construction with FOURFOLD insulation and retention merits your closest study and comparison.

When the next requirement for batteries appears on your desk, request C & D prices — from the electric industrial truck manufacturer on new equipment . . . or from the C & D factory or one of its district offices if the batteries are replacements.

PREMIUM POWER — BUT NOT A PREMIUM PRICE

A few territories are still open for competent representatives.



C & D "SIXTY" *Aircool* **BATTERIES**

INSULATION FOURFOLD RETENTION

1. Vertical Fibre Glass Retainer
2. Horizontal Fibre Glass Retainer
3. Perforated Hard Rubber Retainer
4. Microporous Rubber Separator

C & D Battery Company, Conshohocken, Pa. — *Building Better Batteries for more than 40 years*

HEAVY DUTY BATTERIES FOR ELECTRIC INDUSTRIAL TRUCKS • ELECTRIC LOCOMOTIVES • DIESEL LOCOMOTIVES
AIR CONDITIONING AND CAR LIGHTING • TELEPHONE • MARINE • AUXILIARY POWER
STARTING AND LIGHTING BATTERIES FOR MOTORCYCLES • AUTOMOBILES • TRUCKS • BUSES • INDUSTRIAL EQUIPMENT

The Construction
of Shasta Dam offers

A BIG LESSON IN BULK MATERIAL HANDLING

BELT CONVEYORS

The job done by the world's longest conveyor belt system—at the rate of 1100 tons per hour—and the job it required to keep this line operating under varying conditions of weather and temperature.

A MAJOR objective in material handling is reduction in the cost of transportation, whether of raw materials, processed goods or finished products. In many cases, transportation cost is directly re-

lated to the medium chosen and when that medium is not only the most economical but furthermore is nearly self-supporting, creating independent income from its own operation, a condition approaching the ideal is created. The conveyor belt supplying concrete aggregates during the construction of the Shasta Dam presents a graphic case in point.

The Shasta Dam, located on the Sacramento River near Redding, California, is one of the major structures of its type in the world, ranking closely with Grand Coulee and Boulder or Hoover Dam on the

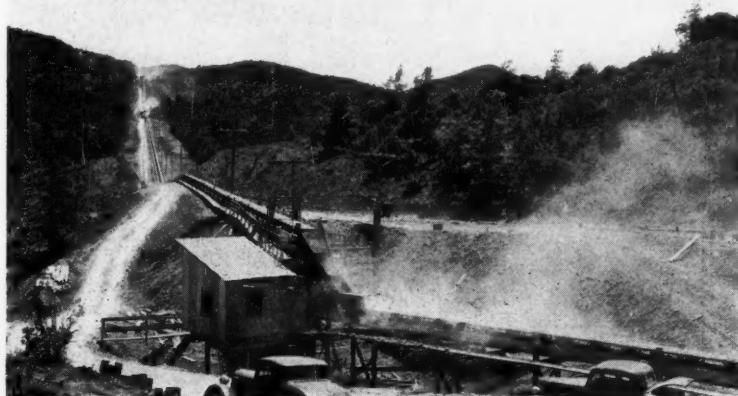


General view of Shasta Dam gravel plant as seen from raw storage conveyor, looking south.

Colorado. From apron to crest, the sheer concrete wall of Shasta towers 560 feet. The drop of water from its spillway is three times the height of Niagara Falls. Twelve million tons of concrete aggregates were employed in the construction, conveyed by a belt twice as long as any then existing.

Suitable sand, gravel and cobblestones were found in the bed of the Sacramento River on the outskirts of the city of Redding. Plans for haulage by a spur railway or an almost bumper-to-bumper truck convoy were abandoned in favor of a gargantuan conveyor belt with a rated capacity of 1,100 tons per hour. The belt conveyor system consisted of two main lines. One extended 9.6 miles from the gravel washing plant near Redding to Coram, and the second installation, totalling 1.2 miles in length, relayed the aggregates from Coram to the dam site. It is with the first and longer belt that this article is concerned.

The Redding-Coram belt com-



Main belt system handling initial loads. End of flight 25, foreground. No. 26 is at right.

prised 26 sections, or flights, joined one to another by discharge of transfer chutes. It took a million pounds of rubber, to mention one item, to produce a belt 36 inches



Closeup view of flight No. 9 carrying six-inch cobble stones. Breakage was negligible.

wide and over 19 miles long, allowing for the return loops. Details of construction and flight-to-flight transfer of aggregates are shown in the accompanying photographs, furnished through the courtesy of the Bureau of Reclamation, U. S. Department of the Interior. In operation, the belts travelled at the rate of 550 feet per minute, or slightly in excess of six miles per hour. Material leaving the processing plant near Redding reached the control tower at Coram in one hour and forty minutes.

The terrain between the processing plant and Coram is mountainous. But, given the dry climate, this disadvantage was offset in part by lack of forest cover and the right of way was readily cleared of scattered bush and shrubs. Twenty-two of the 26 flights moved their loads upgrade and were powered with a 200 HP motor apiece.

The remaining four ran downhill, and the ingenious designers used this momentum to generate electric power to activate the motors. The vertical lift was 850 feet, the drop in the remaining sections about 700 feet. Literature issued by the local Chamber of Commerce gives the impression that the four downgrade installations provided electric power sufficient to drive their 22 hill-climbing brothers. The Bureau of Reclamation, which supervised the dam construction, states conservatively that the downgrade motors "acted as generators to restore some of the power consumed on the long

uphill climb". The contractors replied to an inquiry, "We considered the venture quite successful and can say that transportation by conveyor belt is economical. Operating costs, are considered secrets of the trade."

Construction of the belt system began on November 4, 1939, before wartime shortages made special equipment difficult or impossible to obtain. Floods severely damaged two river crossings when the work was just completed, but the first aggregates went up to Coram on May 6, 1940. Enroute the conveyor bridged the Sacramento River twice, two railroads, three highways and seven lesser roads. A service road, shown in the illustrations, was built paralleling the conveyor, for utility in its construction and in daily inspection and maintenance. The general installation also included a 60,000-volt power line with two transformer stations and twin water systems, to settle dust caused by operation of the loaded flights.

At the Redding or loading end of the conveyor, sand and gravel was ready in stockpiles, having passed through the processing plant. To the usual procedure of separating (screening) and washing the aggregates, producing fine sand and four sizes of gravel, up to cobbles six inches in diameter, the thrifty contractors added a battery of Pan American jigs and recovered the gold content of the sands. The oper-

ators say only that their venture in gold mining was "successful"; former employees report that a substantial part of the entire cost of excavating and processing was paid for by the yellow metal won.

Loud Speaker Control

The working day on the conveyor began at 7:45 a.m. and often lasted until midnight. With 5,000 horsepower harnessed in tandem, as much as 20,000 tons of aggregates, equal to 400 railway carloads, made the trip daily. Depending upon the need of the concrete mixing plant at the dam, from six to 12 eight-hour shifts were worked weekly, with occasional third shifts in emergencies. In times of stress the belt bore successfully a load of 1,700 tons per hour, a third more than its rated capacity.

By pressing a button, the feed at Redding was altered instantly from sand to any of the larger aggregates. Customarily, each size was loaded for a period of one hour, in turn, unless otherwise ordered. The operator at Coram controlled the entire system, employing a party telephone line and loud speakers mounted at each transfer point to give orders and signal for repairs. When operations commenced in the morning, the entire line did not start simultaneously. Flight 26, at Coram, was put in motion first, then Number 25 and so on down the line. In six minutes time, how-

Aggregate storage bins at Coram. A portion of the aggregate conveyor is shown in background.



ever, all the belts were moving at top speed.

Vigilance for breakdowns was almost fully automatic. A motor failure on Flight 12, for example, would instantly halt all belts from Redding to that point of trouble, to prevent aggregates from piling up, but Flights 13 to 26 continued in motion until emptied or unless stopped by action of the control operator in the Coram tower. Routine repairs were made by a dozen men working on the third shift. Driving along the service road paralleling the belts, they repaired or replaced worn bearings, chutes, belting or rollers. Two other workers had permanent jobs greasing the rollers. They covered the entire 9.6 miles in two months, when they started over again.

Normal operations of the entire conveyor were handled by a foreman and seven men per shift. The tower man at Coram controlled all movement. Three oilers patrolled their respective sections, oiling motors and driving mechanisms and hosing down silt accumulations at transfer points. A mechanic and helper, motorized, were instantly available for emergency repairs.

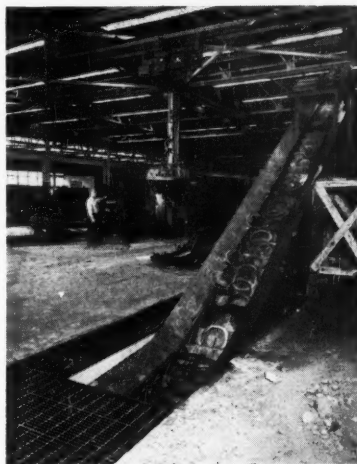
Critical Areas

The wear on the belt was unexpectedly small, and uniform despite changes in grade. As was to be anticipated, wear was somewhat greater on short flights than on those of maximum length, such as Number 25, which stretched a full half mile downgrade. No replacements were required; in fact when the conveyor was dismantled upon completion of the Shasta Dam, over 24,000 lineal feet of the 36-inch belting were shipped to South Africa, where they are now in service. Several serious cuts, one 2,000 feet in length, resulted from the intrusion of tramp iron or the plugging of discharge chutes, causing the jammed aggregate to rasp the belt surface. Cuts were spliced and anti-cut apparatus installed. A magnetic detector, a sort of electric eye, stopped the flights whenever iron entered the flow. Automatic devices tripped power switches, cutting off the motors if transfer chutes became overloaded.

Critical areas of the long moving system were at the transfer points, where the aggregates descended

GETTING RID OF THE SCRAP

THE hinged pan-type conveyor shown carries scrap within reach of the electro-magnet at the left of the photo.



An under-the-floor belt conveyor receives the scrap material from the punch presses and discharges into the pan-type conveyor. The lifting magnet is shown loading the baler, and the same equipment also unloads the finished bales.—Courtesy, Westinghouse Electric Corp., Buffalo Plant.

from one flight to the successor. To lessen the impact of the sliding sand and cobbles, two rows of especially designed troughing rollers, each consisting of 12 wheels shod with 8x2.5" pneumatic tires, supported the receiving belt under the outlet of the transfer chute.

Even dry countries experience occasional precipitation and the roofless belt presented problems in bad weather. Light or moderate rains caused the downgrade belts to slip on their rear pulleys and tend to run away. On such days, also, uphill belts slipped on their wet drive pulleys until aggregates piled up at the lower ends and blocked exits of the chutes. However, when lagging with roughened surfaces was attached to the drive pulleys, even the heaviest rains caused no further slipping. But three inches of wet snow shut the line down completely. Gravel and sand balled up at the head ends of the belts and choked the chutes.

Temperature also taught its lessons. On cold days, morning starts had to be made with great caution, for overnight the belts tended to freeze to the pulleys and the aggregate to the belts. When such overnight freezes occurred, belts were not

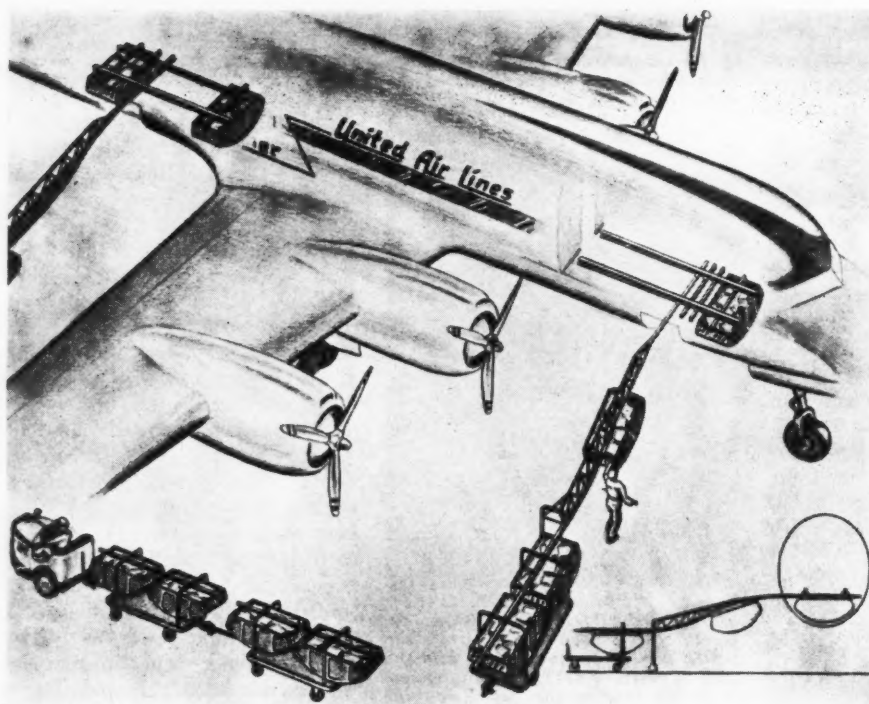
started until the ice had melted; fortunately the noon temperature at Redding almost always produced this result and prudent stockpiling at the dam site permitted delay in operation until safe conditions had been restored. However, when drops in temperature occurred during continuous operation, work was carried on without abnormal difficulties in temperatures as low as 20 degrees Fahrenheit. Oddly enough, a temperature of exactly 32 degrees proved the most dangerous, for at that point small particles of ice built up on rollers and pulleys, causing several runaways.

Fine particles of sand, carried around on the return trip of the belts, and dropped into the bearings caused excessive wear until corrected by the installation of wipers and water sprays at each transfer point. Where possible, such fines were dumped on the following flight by a drip. Spillage and escaped fines at transfer points were removed periodically.

Compared with the 12,000,000 tons delivered, the loss of aggregates in transit was negligible. Silt due to rubbing and grinding enroute increased from nil at the Redding processing plant to .2% at Coram on cobbles, to .5% on fine gravel and .6% on sand. This accumulation caused no ill effects upon the concrete mix, but raised disagreeable dust clouds at transfer points until water sprays were erected at intervals along the conveyor system. It was noted that breaking and chipping of cobblestones increased from .3% on capacity loading to .8% when the belt ran only half filled.

The ingenuity of the contractors that overcame all physical obstacles was stymied by red tape. Radio control of the belt line had been planned, but when the designers learned that by Federal regulation every maintenance man talking over the air would require a license and each conversation must be logged in full, they abandoned such rigamarole and resorted to the telephone with auxiliary buzzers and loud speakers at all critical points.

Belt conveyors at Shasta Dam had their longest and one of their hardest tests and passed with honors, appreciably reducing the cost and time of construction of one of the world's greatest dams.



Schematic drawing shows monorail trucks, loading arm, arrangement of pre-loaded baskets in DC-6.

Air Cargo Handling-BY MONORAIL

United Air Lines introduces monorail handling in cargo loading of the new DC-6's. Time for a 1,500-pound load: five minutes. Method: pre-loaded monorail containers. Payoff: 300-mile-an-hour flight schedules are aided because scheduled ground time is maintained.

By M. B. CRAWFORD

Equipment Engineering Superintendent,
United Air Lines, Chicago

NOW monorail equipment has taken to the air in an experiment conducted in connection with pre-loaded cargo containers. The novel application has been conducted with a good promise of success by the Equipment Engineering Department of United Air Lines, Chicago.

This cargo handling method was developed in connection with the

new DC-6 ships, designated Mainliners 300 by United. These four-motored, 54-passenger planes cruise around 300 miles an hour at an altitude of 17,000 feet.

The space for cargo pits was restricted by the design, leaving two areas under the cabin floor, one fore and one aft of the wings, as shown in the diagrammatic scheme.

These areas are approximately 72" wide, 30" deep, and 90" long. The 30" height of the pits obviously offered obstacles to efficient handling in loading and unloading. The cramped space required a man to crouch very low in order to load cargo laboriously piece by piece. This time-consuming manual method was of course something that

Mockup of belly pit. Monorail baskets avoid this slow, awkward handling, help maintain schedules.



United engineers wanted to avoid. The air lines sell speed. The DC-6 ships are super-speeders now being placed in operation on our Company's coast-to-coast and Pacific Coast-Honolulu route. The avoidance of ground delays due to cargo handling was naturally a prime consideration.

A 5-Minute Method

Up to that time, planes had cargo pits above the cabin floor. The below-the-floor pits on the DC-6's therefore posed a new problem for the Equipment Engineering Department. Here is how we approached the solution.

In the extensive shops maintained by United in Chicago, wooden mockups were built of the belly pits. Various loading methods were then tried, as follows: 1. Manual handling of individual pieces. 2. Pre-packaging (combining smaller units into larger packages). 3. Pre-loaded containers suspended from monorail tracks, and loaded into the ships by use of such a rail system. Here are the results that were obtained with each method. The weight of the cargo for both pits was approximately 1,500 pounds.

Piece-by-piece handling required 35 minutes and the pre-packaging method 22 minutes. Both of these were eliminated. The pre-loaded monorail container method, the one adopted, required only five minutes.

The first containers, used in the mockup, were made of plywood, chicken wire and steel tubing. They were of course shaped to fit the curvature of the hold, four baskets

to each pit. After a variety of practical tests, the baskets were made out of duraluminum. Each weighs 19 pounds and has a blackboard placard on each end for easy identification of the destination.

The baskets are moved on a monorail system, which consists of four separate parts. 1. The loading and storage tracks in the express room at the air port. 2. Monorail-equipped casters trucks (see photos) on which the pre-loaded containers are moved to the planes. 3. The loading arm that connects the casters trucks with the rails in the cargo pits. 4. Finally, the monorail trackage in the ship itself, a permanent part of its cargo handling equipment.

As the designation "pre-loaded" indicates, the baskets are loaded ahead of time in the cargo room. From the storage tracks they are run over dips to the rails on the four-caster carriers, whose beds measure 8' x 21½'. The monorail is suspended by a tubular structure on each end of the truck, which also has a towing hitch. At one side there is a hand wheel that adjusts the rail vertically with the loading arm leading to the ship's pit, or with the storage track in the cargo room. The swivel casters at one end of the truck permit ready adjustment horizontally.

The tractor tows the loaded trucks to the DC-6, and the rail on the truck is attached to the loading rail. With the latter locked in position at both ends, the loaded baskets are then pushed over the rail into the pit. Here the unit is locked on a transverse, trolley-mounted

rail section that is moved forward or aft on the double track attached to the ceiling of the pit. When in position, the baskets are locked by use of a device which is an expanding wedge-type lock.

The four baskets per pit have a weight empty of 72 pounds, or a total of 144 pounds for the eight baskets. Since the aluminum rails in both stowage areas weigh 26 pounds, the combined weight of the equipment carried by the plane is 170 pounds. This weight is not critical, because of the shape of the area and density of the cargo. It is impossible to get the maximum load in these small pits with normal cargo because of its bulk, and hence we actually take very little penalty weight-wise.

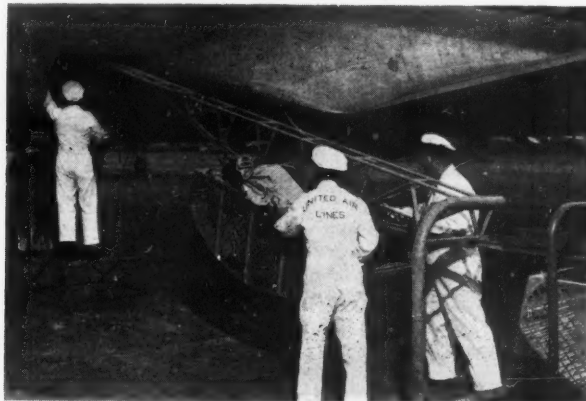
A Convincing Example

Moreover, the advantage of the fast loading or unloading time is so important that the extra weight carried is negligible as a factor. Let us suppose a DC-6 is operating with the loose cargo method (handled piece by piece), and we can paint a picture of inefficiency and delays. We are assuming this ship is leaving from New York City with freight for Chicago, Omaha, Denver and San Francisco, with the pieces stowed "loose" in the pits. In Chicago, because of the limited time and space, the cargo starts to get mixed up. Part of the Denver cargo will be in the Omaha pit, and the overflow will probably be in with the items destined for San Francisco. What happens en route? By the time the DC-6 lands in

(Turn to page 60)

Close-up of monorail-equipped trucks with baskets, with loading rail shown at left of photo.

Via loading arm pre-loaded basket is moved from truck, right to monorail system in Mainliner 300.

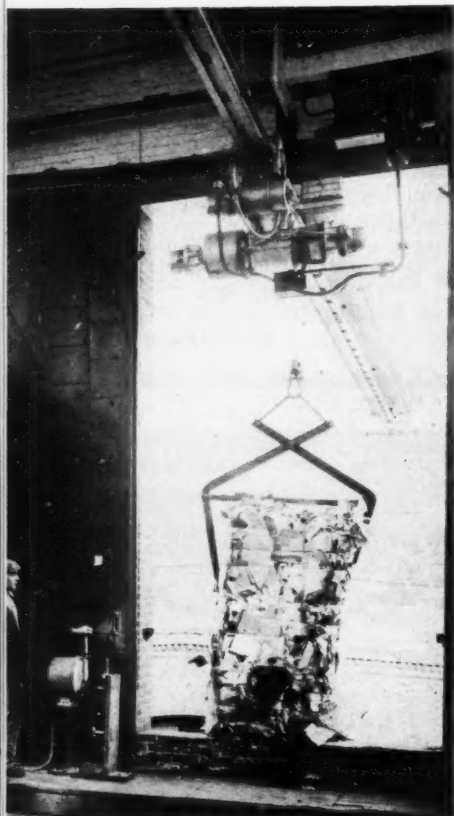


HIGH-SPEED HOISTS, CRANES

Heavy Traffic Overhead



- High-speed type hoist provides fast handling for bales from trailer to storage.
- On upper floor bale is deposited in an upright position. Note hoist pulpit control.



A heavy tonnage floats through the air in this Massachusetts plant . . . 1,000-lb. bales of waste paper travel by high-speed hoists . . . cranes serve storage and production departments, moving five-ton loads (sometimes in conjunction with on-the-floor equipment) . . . and the grabs are part of the interesting production picture, whose fast pace is aided by fast handling.

A HEAVY tonnage travels overhead—that's the outstanding impression one receives on visiting the Paper Mill and Box Plant of Bird & Son, Inc., East Walpole, Massachusetts. This plant of the company produces liners and chips for corrugated and solid shipping containers, as well as a variety of specialty papers.

Two Bales in Three Minutes

Production starts with pulp and waste paper stock. The bales of pulp arrive by freight car on a siding that is approximately 20 feet above the floor level of the stock sheds, and this material is conveniently chuted from the cars through wall openings for piling.

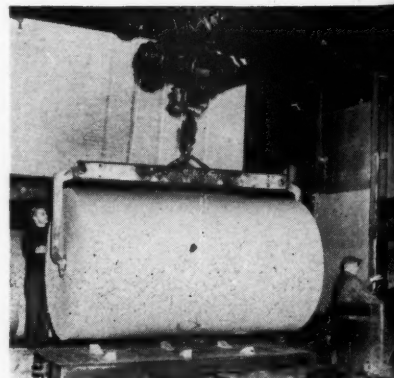
The considerable tonnage of waste paper arrives for the most part by highway trucks, in wired bales averaging about 1,000 pounds each and measuring approximately 6' x 4' x 3'. This material is transferred from the vehicles to two floor levels of the stock shed. Bales destined for the first floor are removed by a 2,000-pound fork lift truck directly from the trailer bed and are run through the road-level doorway to storage or the beater.

The photos reproduced on these pages also show the method used for transferring the bales to the

upper floor level—a remarkably efficient operation that is accomplished by high-speed type hoists operated by distant or pulpit controls. The two hoists used for this purpose (at two points on the second-story level) are motorized both for hoisting and for travel.

The layout of this operation can be conveniently seen from one of the photos. The arriving truck-trailers are spotted under the monorail that is built over the driveway. The storage shed is to the left in this photo. The second floor is about 12 feet above the truck bed. Operating with an ice

From weighing bridge crane deposits 5-ton roll on trailer for transfer to storage.



tong type grab, the hoist is run out over the vehicle. The operator on the trailer centers the descending grab over the bale. The grab legs are equipped with spikes, one on each. As the hoist lifts, the spikes pierce the sides of the bale—and in a matter of seconds the load has been deposited on the second floor for further handling (either to the nearby storage location or to the point of use). Usually the bales are moved only short distances by means of two-wheel hand trucks, and this move is facilitated by the fact that the hoists deposit the bales standing upright.

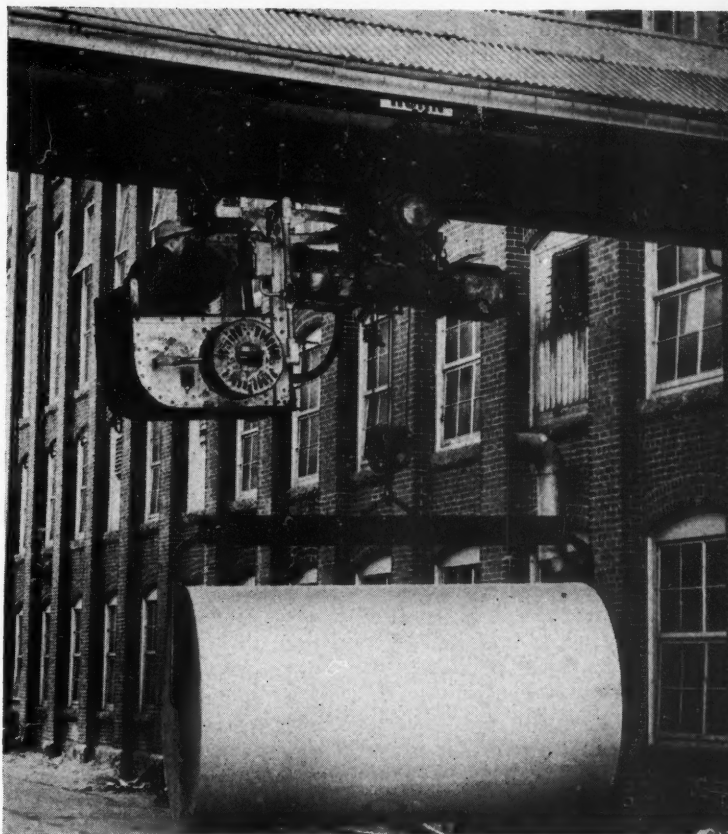
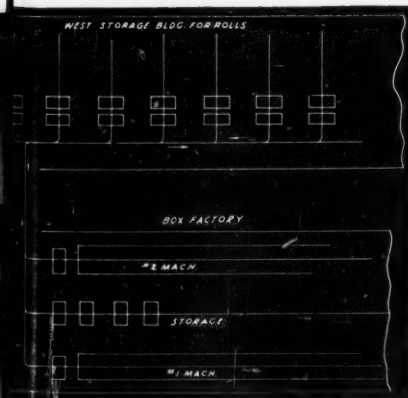
It is a fast operation. Under optimum conditions each hoist will handle two bales a minute from the highway trailers—that is, provided the bales are not odd-sized and are packed well. Allowing for these irregularities, production over a period of time will average close to two bales in three minutes, or $1\frac{1}{2}$ bales per minute.

Five-Ton Rolls Travel Overhead

As previously indicated, the fact that the bales are picked up and deposited in a vertical position likewise contributes importantly to the efficiency of this handling. Formerly, when a different method was used, considerable extra man-hours were required for turning the bales from a horizontal to a vertical position. And this meant strenuous physical effort. Today, all the hard labor is performed by the hoists.

When necessary, the hoists also

Layout of overhead trackage that connects west storage building with the box factory.



Cab-controlled unit transfers load from west storage to factory across driveway.

deposit the waste paper (from the trailers) on the ground for subsequent movement to the first-floor storage area. Or, if need be, the bales can just as readily be picked up from the ground for transfer to the second floor. In other words, in addition to speed, hoist handling also provides a degree of flexibility that may be vitally necessary under changing production or emergency conditions.

The waste paper material is fed from the second floor to breaker beaters and hydro pulpers. From here the resultant product is pumped to the secondary beaters and the Jordan refiners, then to the paper machines. These produce another material handling requirement, which is also largely met by use of overhead equipment. The rolls of jute liner or chip coming off the paper machines are more than five feet in diameter, between nine and 10 feet long and weigh approximately five tons each.

The giant-size rolls are taken off

the machine by a hoist and are deposited on a scale platform immediately to the rear (west) of it. This platform extends from the production department into the temporary storage room adjoining to the west. This room is also served by a hoist on a traveling beam, which picks the weighed rolls off the platform and deposits them in the 80-foot-long area. (This room chiefly serves for storage of work produced on the night shift.)

From here the rolls are moved into either of two pit storage buildings (one east and one west) where they are held until needed in the box factory. The transfer from temporary storage, as also in the case of the waste paper bales, is through a combination of overhead and on-the-floor equipment, as follows. The roll is picked up by the pendant-controlled hoist and lowered on a rubber-tired trailer, whose bed measures approximately 48" x 120". These loads are hauled by tractor, as shown in one of the

photos, to either the east or west pit storage buildings.

The east storage area is covered by an overhead traveling bridge crane, using a motorized, automatic grab. (A close-up view of the latter can be seen in one of the photos.) Thus the crane operator does the entire job without aid from a hook-up man. He lowers the self-centering grab on the roll, picks it off the trailer and deposits the material in the proper stockpile. From here, of course, the material is moved to the box factory in reverse order by the same crane-and-tractor combination.

The operation in the west pit building is somewhat different, though just as efficient in terms of a heavy tonnage handled without physical effort on the part of operators. The main difference here is that the area is served by a cab-controlled transfer crane, which delivers the loads directly to the box factory. The latter is located across a driveway from the storage building, and both buildings are connected by the overhead track system on which the cab-controlled unit operates.

A diagrammatic sketch of this track system is shown on these pages. The transfer crane (traveling on the longitudinal main track in the storage building) is locked

up with any of the transverse spur tracks extending over the individual pits. Incidentally, this unit uses a manually operated grab, as shown, and hence a crane follower is required. In passing it may be observed that a hook-up man may well be justified from an economy viewpoint where he contributes materially to the efficiency and production of the crane operator. Of course, the type of operation and the nature of the material handled are factors in any decision made in this respect.

Thus the cab-controlled unit picks up the heavy rolls in any of the pits, returns with the load to the main longitudinal track, at whose southern end the crane is locked up with the transverse line leading to the box factory. One of the photos shows the crane transporting a five-ton roll across the driveway, on its way to the box factory. The maximum distance from the west storage building to the factory is approximately 200 feet.

In the factory building the rolls are deposited either near the feed end of the combining machines, or in a zone storage area located midway between the No. 1 and No. 2 machines. The entire factory area is covered by a second cab-controlled crane, which moves the

loads as required. (The rolls from the east storage building are, of course, delivered to this point by tractor-train.) The factory crane usually stays in its building, though it may travel into the storage building should the need arise. As a rule, however, it is kept busy serving the machines and with jobs incidental to this main task. One of these necessary incidental tasks is the shafting of the huge rolls—and the long and heavy shafts would be difficult to manipulate without the crane.

"It Was Not Always So"

The cranes in both pit buildings handle approximately 200 tons of rolls daily per 12-hour period. This figure covers only the tonnage coming off the paper machines, not that being transferred from storage to the box factory. Though the loads are heavy and cumbersome, they travel rapidly between the various locations described—and no operators need exert themselves.

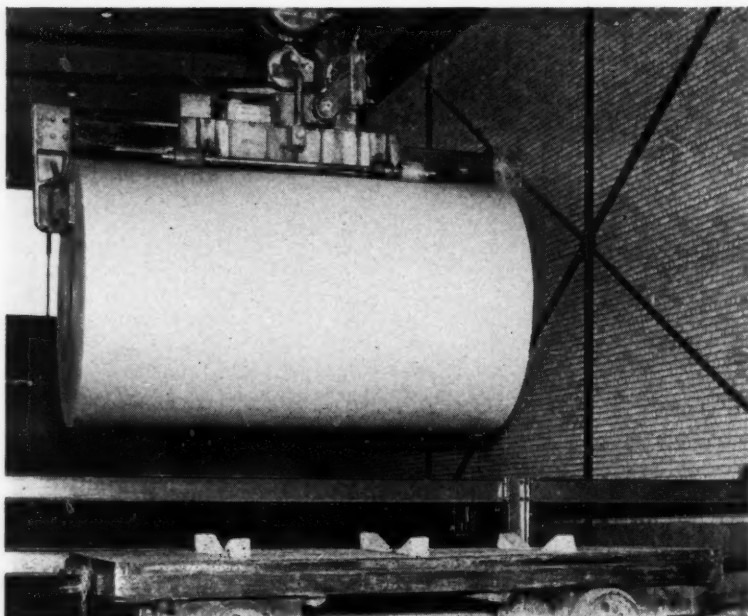
It was not always so. In the days before crane handling and pit storage, huge loads of this type required a good deal of physical exertion. From the weighing scale the rolls were moved via transfer cars to "flat" storage, where men had to strain themselves in rolling the paper onto the skids. Every move involved the extra-heavy muscular exertion. This type of handling is well remembered by men in the Bird & Son organization, which celebrated its 150th anniversary two years ago. This slow and inflexible method was both cumbersome and costly.

While some of the buildings involved in this description have served a respectable number of decades, the company's progressive management has paced advances in production with advances in material handling. This twofold development was naturally based on the understanding that maximum benefit from modern production methods can be realized only through equally modern handling methods engineered as an integral part of the over-all manufacturing process.

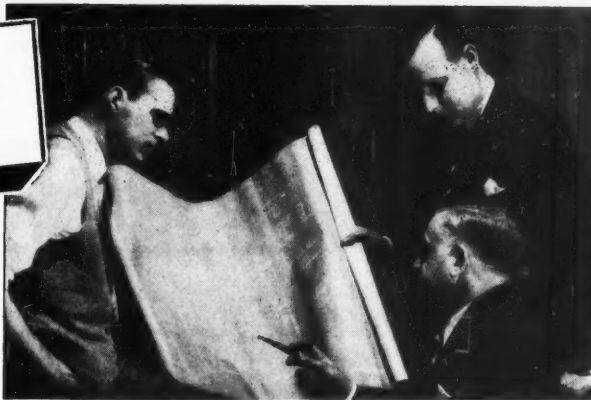
You May Win

Cash awards totaling \$1,500 are offered in the current FLOW contest. See announcement on page 78.

This is a view of the west storage building. The bridge crane removes the heavy rolls with a motorized grab that is self-centralized.



"These are days when it is wise
to take a second look at costs."
— Business Week



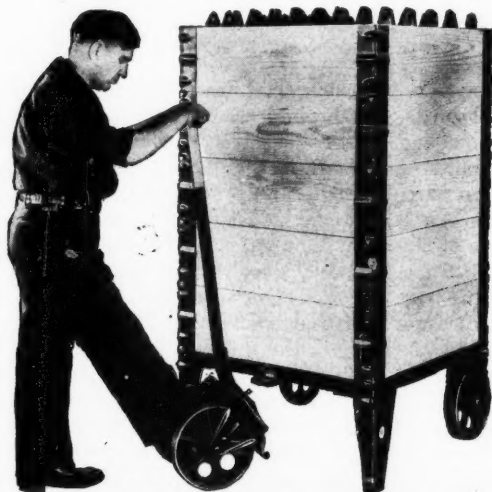
Watch Your
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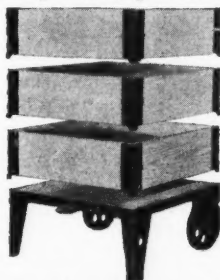
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why modern material handling requires....

ELEVATORS DESIGNED FOR INDUSTRIAL TRUCK LOADING

Your industrial truck elevators are subject to more serious overloading than your regular freight elevators. Proper provisions for industrial truck loading must be made in new buildings, and existing plants should be examined for possible needed reinforcements. See the five design modifications given in this article.

TWENTY years ago the majority of freight elevators were subjected mainly to distributed loading, such as that which occurs when the car is loaded or unloaded with relatively small parcels. There was a standardized garage elevator with a capacity of 4000 to 6000 pounds which was used to transport passenger automobiles and small, light-duty automobile trucks. But this type of elevator was designed for the relatively symmetrical loading which results from the standard gauge of automobile wheels, and was therefore not generally suited for industrial truck loading, in

which symmetry is the exception rather than the rule. With the passage of time, however, new and more efficient means of handling materials within factories and warehouses made their appearance, and a new and very severe type of elevator loading came into existence.

This new type of loading was brought about by the increasing use of skids and pallets and by the use of industrial trucks to handle them. At first, industrial trucks were of such varying design, and the applications of the trucks so different that each installation of a freight elevator had to be treated

as a special case. The entire elevator had to be engineered from start to finish, which involved knowing the exact size, loaded weight and wheel spacing of the specific industrial truck to be used. In some cases data were hard to obtain, since owners and planners were seldom sure what kind of industrial trucks they may want to use in the future.

Today, however, these trucks, although manufactured by many independent companies, have enough characteristics in common and have been standardized to an extent where the load distribution and

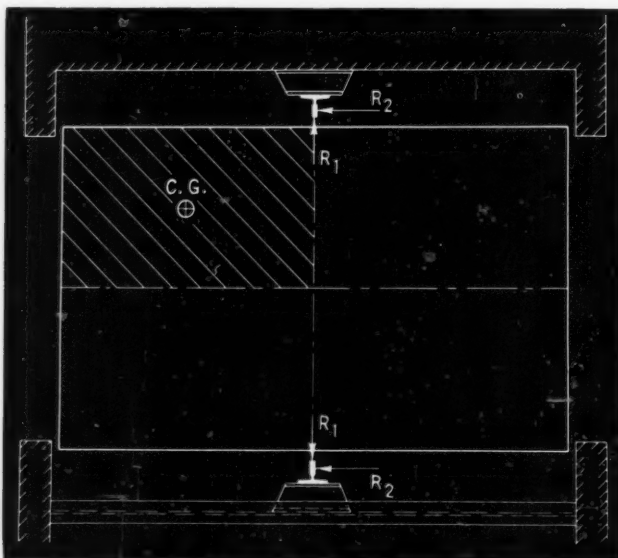
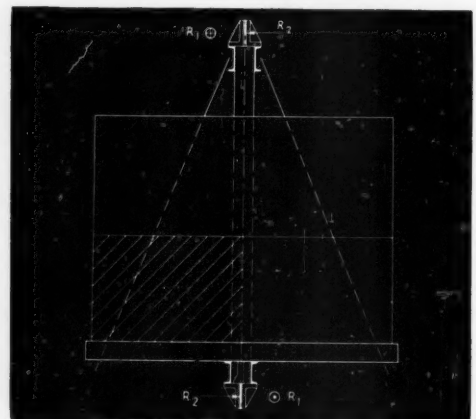


Fig. 1 (left) and 2: Eccentricity of loading with hand piling of individual packages. See the article.



wheel load concentration are known for many different sizes of trucks, and can be provided for in a single standardized design of industrial truck elevator.

Hence, it has now become practical for a manufacturer of elevators to prepare data covering standard platforms, carframes and guide rail requirements to suit three types of freight elevator service, instead of only two. There are: 1) *Regular freight service*, in which the load consists of relatively small parcels, placed on and taken off the car by hand.

2) *Automobile-truck service*, where the loads to be lifted will be autos and trucks.

3) *Industrial truck service*, in which the elevator car is loaded by or with industrial trucks that run onto the car platform during the loading process.

Eccentric Loading

In preparing designs for a standardized set of industrial trucking freight elevators, it is necessary to make provision for the extent to which the load may be concentrated at one edge and one side of the platform. Figures 1 and 2 illustrate the worst eccentricity of loading, which is likely to occur on a freight elevator subjected to hand loading. In the example shown, all of the load is concentrated on one quarter of the platform, with its center of gravity at C.G. Greater eccentricity is not likely to occur because as more and more load is brought onto the platform, more and more of the floor is covered and the load eventually tends to balance itself.

The effect of this eccentricity of loading on the car is to produce couples which tend to rotate the platform about its two principal horizontal axes. To resist these couples, and prevent the car from skewing, the platform, side braces and car frame must be strong and rigid.

In addition, the car itself is a freely floating body, restrained vertically by the ropes, and laterally by the pressure of the guide shoes on the rails. Since the ropes are flexible, they will oppose none of the rotational forces acting on the car, so the entire rotational effect of the eccentric car loading must eventually be transmitted to the

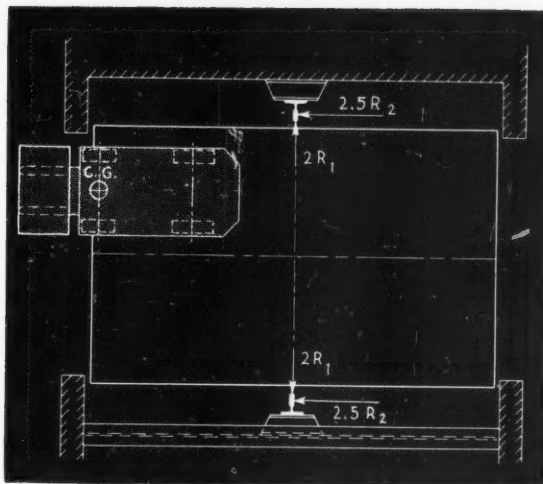


Fig. 3 and 4 (above and below): Truck weight plus live load may produce 2.5 greater reaction than hand loading.

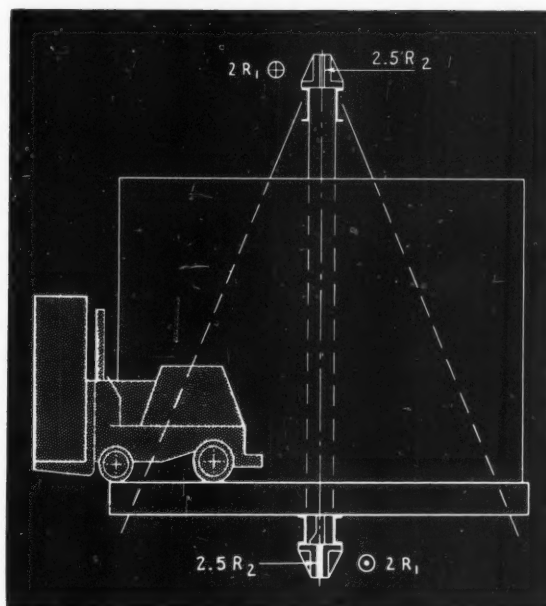
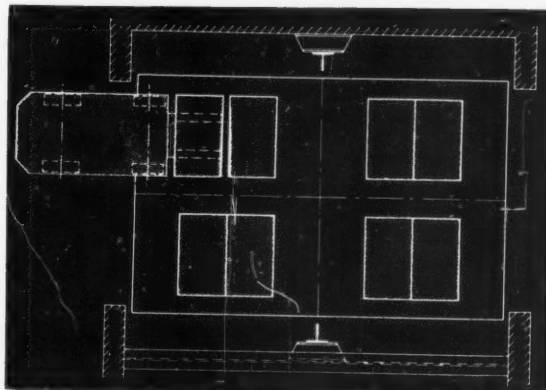


Fig. 5 shows elevator loaded to capacity, but weight of truck may add 50 per cent of carrying capacity.



rails and thence to the rail brackets and the building structure. The resulting reactions are indicated in the figures by the symbols R^1 and R^2 . Since they are the result of couples, they occur in pairs.

Figures 3 and 4 show the same condition for an elevator of the same size and rated load, being loaded by an industrial truck. Due to the way the truck balances the load with the weight of its own engine, the entire payload of the truck plus most of the weight of the truck itself can be concentrated on the front axle of the truck. Hence, in the extreme case we may have the live load plus the weight of the truck all concentrated at the outer edge of the elevator platform. This simultaneous increase in load and eccentricity produces reactions that are from 2 to 2.5 times larger than before.

Forces Due to Impact

There are additional forces caused by industrial trucks which are not present with hand loading. These are the horizontal and vertical forces due to impact. The vertical impact force occurs when the platform is lower than the landing and the wheels of the truck drop from the landing onto the platform. With even a small drop, the impact forces may be very great, and since these forces increase with the load and with the distance of the fall, automatic leveling should be a MUST on all industrial trucking elevators.

The horizontal impact forces on the platform result from changes in the momentum of the truck with its load, and tend to translate the car toward the rear of the hoistway and also to twist the car frame about the axis of the ropes. No one who has ever watched an experienced driver move his loads at high speed and stop literally on a dime will underestimate the reality or magnitude of these forces.

An industrial truck elevator is subject to much more serious overloading than a regular freight elevator, as can be seen from Figure 5. In this diagram the elevator is loaded to capacity with four truck loads—one on each quarter of the platform. However, most, if not all the weight of the truck is on the platform when the last load is de-

posited, and this extra weight may amount to 50 per cent or more of the full load carrying capacity of the elevator. In this case the rotational forces are the same as those previously discussed, but the added weight must be supported by the frame, ropes and sheave shaft, and must be opposed by the brake and, in an emergency, by the car safety, even though the elevator will not be called upon to lift the extra weight (except in re-leveling).

Elevator Design Modifications

As with many engineering problems, the solution to the problem of designing an industrial truck elevator becomes obvious as soon as the various forces involved are isolated and analyzed. Of course, these forces will vary with different styles and models of industrial trucks, and with the various types of loads to be handled. But while they vary, they can also be segregated into classes and groups which permit generalization and standardization of design to the point where all the factors can be estimated within safe limits and appropriate allowances made. These allowances for industrial truck loading generally fall into the five following classes: 1) The platform must be strengthened to withstand the heavy concentrated wheel load. 2) Side bracing must be strengthened to prevent the platform from tilting. 3) The car frame must be made more rigid to withstand the twisting and skewing effect of the eccentric loading. 4) Sheave shafts, sheaves, brakes, hoist ropes, and car safeties, etc. must be checked against the increased weight of the heavier strengthened car and the probable overload due to the front wheels of the industrial truck running onto the already loaded platform. 5) Rails and rail brackets must be strengthened to transmit the guide-shoe forces to the building structure.

Structural Requirements of the Building

All vertical translational forces on an elevator transmit themselves to the machine and thence through the machine beams to structural columns. This is not true of the rotational forces. These become

horizontal forces on the guide shoes, the rails, and the rail brackets, and are eventually transmitted to the structural member or walls to which the rail brackets are fastened. As has been explained, these rotational forces are exceptionally high when industrial truck loading is used, and for this reason any building into which an industrial truck elevator is to be installed must be designed (if new) or examined and usually reinforced (if existing) to provide rail bracket supports which are adequate, both as to spacing and strength.

Conclusion

Industrial truck loading increases the stresses in elevators to such an extent that the continued use of industrial trucks with an elevator not designed for such use might be dangerous, and would certainly cause rapid deterioration. However, the standardization of elevator designs to accommodate industrial truck loading is not impractical and has been accomplished.

The installation of an industrial truck elevator in a building necessitates proper bracing and provision for decreased spacing between rail brackets. These are easily arranged while buildings are in the design stage but are more difficult to provide in existing buildings—particularly old buildings.

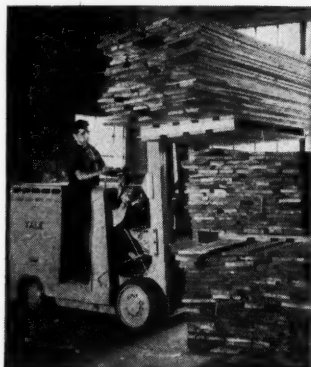
With the rapid increase in the uses to which industrial trucks are being put, designs for industrial buildings of two stories or more should include provision for industrial trucking elevators wherever there is any probability that industrial trucks may be used in the future.

Data and photos, courtesy Otis Elevator Co., New York City.

\$1,500 In Awards

See the FLOW contest announcement on page 78. You may share in the awards by submitting a prize-winning paper on a cost-reducing installation. Read the simple rules, then write in for your entry blank.

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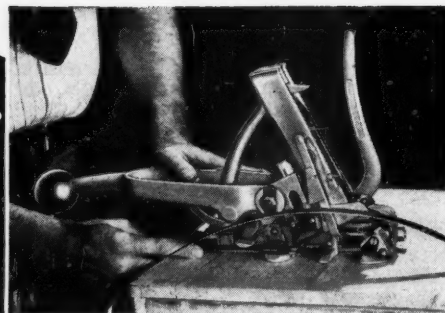
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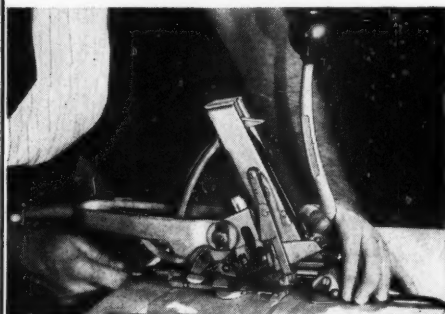


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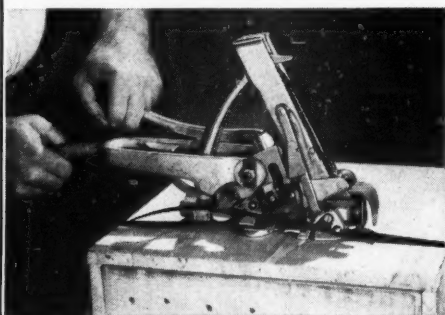
STEEL STRAPPING AND CAR BANDING SYSTEMS



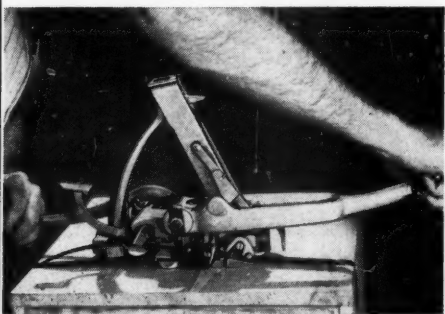
1 Free end of strapping is slipped under straplock and against stop.



2 Loop of strapping is slipped under straplocks and between shear blades and pulled tight.



3 Strapping is tensioned by bringing tightening handle back to horizontal position.



4 Strapping is cut and seal crimped by moving sealing lever forward.



PACKAGING MECHANICS



Beginning a new regular monthly section in which will be presented solutions to the problems of efficiently filling and handling the boxes, cartons, bags, bottles, cases, etc., used in commerce and industry.

14,000 JARS Per 7½ Hour Shift

A progressive assembly line method for packaging jars or cosmetic products.

SINCE about a year ago, the Jewel Tea Co., Inc., Barrington, Illinois, has manufactured a new cosmetic product, a cream shampoo. Of particular interest from a material handling standpoint is the progressive packaging method used, which is typical of the methods employed for other cosmetic items produced by the company.

The material is manufactured on the fourth floor, and after blending it is transported in 15-gallon stainless steel tubs (on pallets) to the

second-floor filling department. The contents are emptied into the hopper of the filling machine, originally designed for dental cream, which was specially adapted for the cream shampoo.

Because this semi-solid material does not flow, the following changes on the machine were made by Jewel Tea Company engineers. The crimping mechanism (for tubes) was removed and the saddles changed to accommodate the glass jars. Among other changes, the filling machine was also made adjustable to large and small jars, which means that the filling tube had to be centered over jars of different

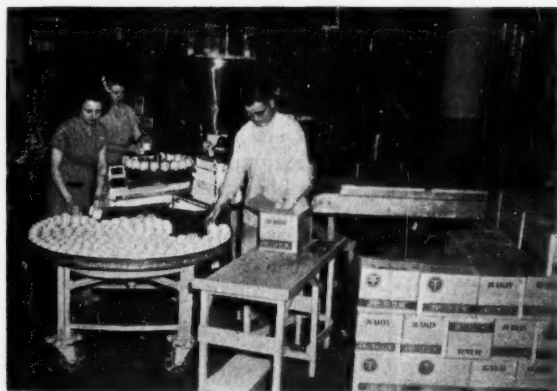
sizes. Another noteworthy point is the fact that these and other modifications were made in such a manner that the original parts can be reinstalled in the machine when dental cream is to be run again.

The pallet loads of tapered glass jars are spotted at the head of the line. As the individual jars are removed from the corrugated containers, they are placed on a revolving-top table whose diameter is 48 inches. This type of table is mounted on casters, giving it mobility for use in any of the several packaging lines.

The operator at the west side of the filling machine transfers the

Start of line: jars from revolving table go to filling machine, then start down conveyor line.

End of line: from compressor, full cases emerge on wheel conveyor. Loads are accumulated nearby.



empty jars from the table to the saddles. Since the table top is turned as it is loaded by the first operator mentioned, the operator feeding to the saddles has a constant supply of jars within her reach. The filled jars are taken off the saddles by an operator on the east side of the machine, and she places them on a conveyor table that is about 34 feet long. The jars travel on the 12-inch belt running in the center of the table at the rate of 30 feet per minute. The working surface to either side of the belt is 12 inches wide.

The accompanying flow diagram shows the positions of the packag-

els is held in a fixture, gummed side up. A sponge is run over this surface, and the label applied with a stroking motion of the fingers. This is the only time the jars are picked up and redeposited on the moving belt.

Operator No. 12 checks the labels, and No. 13 retightens the caps. By this time the labeled and capped jars have traveled about three-fourths the length of the table. Here, at the east side of the line, is the carton assembly table, also shown in the diagram.

This part of the job is likewise done according to progressive assembly line methods. The theory is, of course, that operators develop a rhythm in performing a single function, whereas the smooth pattern of a movement is broken up

posited at the end that abutts the conveyor table.

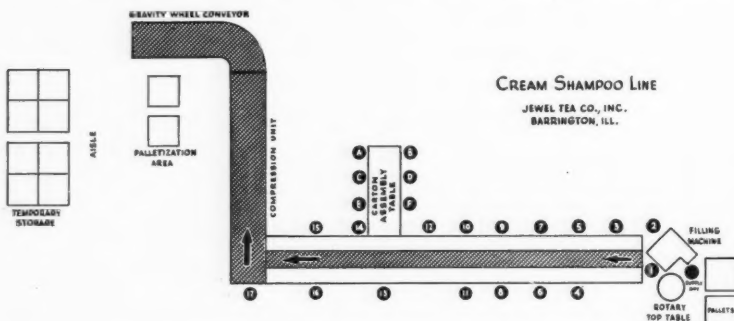
Operator No. 14 inserts the jars as the cartons travel right side up on the line, and No. 15 and 16 attend to the closing with a deft move, done without picking up the units. Two-handed motions are used in this as well as some of the other operations.

Operator No. 17 stands beside a work board that is several inches below the surface of the conveyor table top, a feature which facilitates his dropping the cartons into the shipping containers lined up on this board. No. 17 glues the flaps and then disposes of the full containers by sliding them into the compression unit (see flow sheet) installed at right angles to the line, and adjoining it.

As the cases are inserted, a mercury start-and-stop switch activates the compression belts. The cases advance slowly as each additional unit is inserted in the feed end. At the discharge end, the sealed shipping containers are delivered on a 13-foot section of gravity wheel conveyor.

As the cases accumulate on this line, the packing and gluing operator (No. 17) walks over the few steps from his station and places the goods on pallets positioned at this point. After the completed loads have been checked, they are moved by pallet hand truck across an aisle to a collection area for subsequent movement. This is by motorized hand truck, via elevator, to basement storage, or direct to the order selection area. (*This illustrates the typical flow pattern in this multi-story operation, described in detail in the article on the plant-wide handling methods, page 4.—Ed.*)

The capacity of the filling machine is approximately 14,000 4-ounce jars per 7½-hour shift. Runs are usually scheduled in lots of 100,000 to 400,000 units (referred to as sales). When the run on a specific product has been completed, the same line is used in conjunction with other filling machines—for anything from floor wax to hand lotion, and from six-ounce to quart containers. For the larger cases the compression unit at the end of the line is adjusted accordingly, and that is about the



Flow diagram of packaging line shows arrangement of operators. Article gives complete details.

ing operators along the line. No. 3 places a protective parchment disk over the contents. No. 4 drops the lithographed cap on the jar, while No. 5 tightens the cap. Operators No. 6 through 11, as can be seen are the labelers. Why not machine labeling? As was previously mentioned, the jars are tapered. To fit their sloping contour a die-cut, curved label is required, and this cannot be applied by an automatic labeling machine. Each stack of la-

when interrupted by several tasks. The six operators, three on each side, work as three teams. For example, Operator A opens the carton flats, tucks in the bottom flap and inserts the bottom pad, and deposits the containers in the center of the table. They are then picked up by her team-mate on the opposite side. She folds the scored corrugated liners and inserts them. The prepared cartons are collected at her side of the table and then de-

THE Industrial Packaging Engineers Association of America held its second annual meeting in Chicago April 19 through May 1. The principal address was delivered by Ralph Budd, president of the Burlington Lines. Several papers delivered at the sessions dealt with aspects of packaging in relation to material handling. A selection of these are presented in condensed form on the following pages.

PULL DOWN YOUR MATERIALS HANDLING COSTS

with a HYSTER "20"

Moves and stacks anything up to 2000 lbs.
Pulls down handling costs as much as 20% to
79% (actual case histories). Six other Hyster
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MILWAUKEE, WIS.—Hyster Company

MINNEAPOLIS, MINN.—W. S. Nott Company

MONTREAL, P. Q.—A. R. Williams Machy. Co., Ltd.

NEW ORLEANS, LA.—Hyster Company of Louisiana, Inc.

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PHOENIX, ARIZ.—Equipment Sales Company

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PORTLAND, ORE.—Hyster Sales Company

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ST. LOUIS, MO.—Wharton L. Peters

SALT LAKE CITY, UTAH—Arnold Machinery Company

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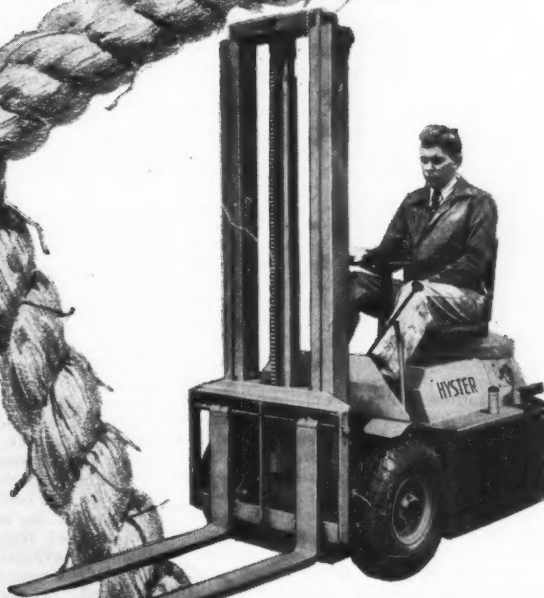
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Ideal for work in narrow aisled
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PACKAGING MECHANICS

only change necessary in operations involving hand labeling.

The Jewel Tea Company designed this progressive packaging method for easy handling and maximum production. Each function is broken down into its simplest components and performed by an individual operator, speeding the flow of the units down the line. It will be realized that the same progressive principle can be applied to many other types of products that can be moved on a conveyor between two rows of operators.

Unit Loading

By J. G. BUCUSS

Manager
Strapping Division
Acme Steel Company

IT HAS been said that packing and shipping are two of the last frontiers in plant operation. Those of us who are concerned with better packaging and better bracing methods know that we will always be confronted with frontiers. Problems arise daily in our planning but they are always successfully solved or re-solved through analysis and study.

You will notice that our title is "Unit-Loading." Over the past years the expression "Unit-Loading" has come into very common use but it can mean different ideas to many. To those of us in the Strapping Industry the trade-mark name "Unit-Load" has a very definite meaning. It very clearly describes the bracing of freight in railway cars under the floating load principle.

This is accomplished by strapping together two or more packages into a larger unit inside the railway car in such a manner that the larger unit is permitted to move under shock or impact. As a result of this freedom of movement, the force of the impact is reduced approximately 50%.

While the development of Unit-Load is comparatively new, it has saved such industries as steel and paper alone thousands of dollars in materials, time and labor that were formerly used for bracing purposes. The Unit-Load method of bracing is being applied daily for the safe delivery of such commodities as chemicals, food products, and beverages in glass containers, as well as radios, refrigerators, enameled stoves, furniture, automobile storage batteries and hundreds of other products.

Through the use of skids or pallets and the floating load method of bracing, it has been possible to entirely eliminate individual containers in which the product was previously packaged.

However, most important to shippers, as well as railroads and receivers,

has been the reduction in product damage claims.

Also, it would be impossible for anyone to evaluate the customer goodwill that has been gained by shippers as a result of their products arriving at destination without loss or damage.

There will continue to be further progress in the application of the floating load principle to transportation of shipments. A new field in which it is now being used successfully is in handling of lumber products. When lumber is loaded in a box car (approximately 25,000 board feet) it requires 24 man hours or more to complete the unloading. This is just the beginning because if you are an industrialist you will have two or more handlings. If you are a retailer or distributor of lumber, you will have a total of at least four handlings before it reaches the job. The same 25,000 board feet of lumber bundled and braced with steel strapping on a flat car can be unloaded by lift truck or crane in two man hours or less. The units of lumber can be assembled in size and weight to fit available mechanical handling equipment. Relative savings also can be effected at the point of loading.

Today, most of the finished lumber is shipped in box cars to provide pro-



tection against weather conditions and cinders. When waterproof paper comes into full supply, it will be very practical to ship this type of lumber on flat cars with equal protection at reduced handling costs.

It is possible that eventually the lumber industry will grade and cut most of its lumber to specific dimensions, then tally, bundle and strap it. This would eliminate waste and freight charges now paid on that waste, and, quite important, it would permit reduced inventories.

Actual experience reveals that at ship-side it is possible to handle 60,000 board feet or more per hour when dimensional finished lumber is bundled and strapped, as against 10,000 board feet per hour when it is not strapped. There are also commensurate savings in time of handling at port of destination as well as at distributing yards.

It has been estimated by some of the larger lumber companies that the over-all cost of handling could be reduced 20 to 50% under this plan of marketing and distributing lumber.

While lumber has been used for the

purpose of illustrating the potential savings in the cost of handling, many products are subject to the same analysis and study with possible greater savings.

An address delivered at the Second Annual Industrial Packaging and Materials Handling Forum, Chicago.

Modern Distribution

By JAMES L. FLAVEN

Materials Handling Engineer
Montgomery Ward & Co.

IN GENERAL, our approach to the development of a Material Handling Program is along these lines.

One very effective way to speed the flow of merchandise, is to introduce the unit load. Unlike the condition existing several years ago, we now find many manufacturers equipped to make pallet shipments and very anxious to cooperate. Usually these plants are mechanized in their handling operations, and to be able to ship on pallets is their ultimate goal. The unit load will reduce our car unloading time, make the checking of loads easier and faster, and will lower the time involved in placing merchandise into stock. This, of course, is not a universal application to all lines of merchandise, but our studies indicate a substantial number of articles can be shipped in this manner. The resultant savings in packaging costs, time, and damages will be most favorable.

We receive a large amount of merchandise that at first glance would appear to be ideal for palletizing. For example, we may receive a shipment of 200 square cartons. They stack well and fit the pallet perfectly. Unfortunately, appearances are deceiving because in this shipment we may have twenty different stockkeeping units; that is, different sizes or colors. The quantity per stockkeeping unit may be one or more boxes and these must be kept separate to facilitate the order filling operation. In spite of such handicaps, we find there are many items suitable for pallet handling.

Even though we now require wider aisles for the fork truck, we can, under certain conditions, increase the capacity of our present building. These conditions are primarily floor load and ceiling height. If however, these factors are not favorable, and the pallet system results in a lower capacity, it may still be justified on the basis of lower handling costs and flexibility which has tremendous value when you have changing inventories.

The addition of mechanical handling equipment such as the fork trucks, conveyors, monorails, and hoists will not only speed the flow of merchandise but will make the handling of heavy items a comparatively easy matter. The warehouse man must be provided with these tools if we are to prevent the loss of valuable man hours due to manual handling fatigue.

The amount of merchandise damaged in transit or in the warehouse can and must be reduced. The continued shortage of adequate packaging

materials must be offset by improved handling methods. Merchandise damaged in transit is not only a loss to the carrier but we lose the profit from the sale of that article. If we damage the merchandise in our own warehouse operation, the company suffers a total loss, less any possible salvage value. By reducing the human element in our handling methods, we can show a corresponding reduction in damage losses.

Since we are shipping to our own stores from the retail pools, it is entirely possible that some day we can expect to palletize these shipments. These loads are usually composed of packages of all sizes and shapes so that we must consider a box pallet, or something similar, to retain the load. This, of course, is one of the later phases of our program but one that will demand attention when the time comes.

Our other flow of merchandise, from manufacturer to store, also presents a complicated problem. Formerly the stock room area located in each store, could accommodate the reserve inventory. In recent years it has been necessary to expand the selling space in the stores in order to handle the increased volume of business. The problem was similar to that of the manufacturer during the war. All available space had to be converted to production. The results were the same—storage or stock room areas were reduced to a fraction of their former capacity. Our only recourse was to obtain outside warehouse space. The amount of space required, depending on the size of the store, varied from a few thousand to almost two hundred thousand square feet. From a material handling viewpoint, some of these locations are not suitable while others present exceptionally good opportunities. Naturally the latter are usually found where we have a large store operation. In these warehouses, we can employ the same methods of handling as we have in the retail pools.

This leaves us with the small stores and their warehouses. Numerically speaking, they exceed by far the large stores. Because of the size and physical limitations of these buildings, it is virtually impossible to consider the use of mechanical equipment and methods. This does not, however, minimize the need for corrective action. In some respects, the problems are more acute than in the pool or larger warehouse operations. As yet this situation has not been fully analyzed so that no definite course of action can be planned. There are undoubtedly several means of approach and one in particular appears to merit consideration. In brief, the plan would be as follows:

- 1) Establish strategically located warehouses to serve a given group of stores. The location is important since it would be highly desirable to be able to make delivery to a customer served by these stores, within a maximum of 48 hours.
- 2) Sales on such lines as stoves, refrigerators, radios, furniture, plumbing fixtures, building materials, and all other

large or heavy articles, would be made from store samples.

The advantages of this plan are numerous particularly in our material handling. We could eliminate a good portion of the manual handling now required in our present operations. More carload shipments could be made from manufacturers. The use of the unit load could be expanded. Material handling equipment would operate at a higher efficiency with the increased volume of merchandise. All this would necessitate larger buildings and of a type more conducive to efficient material handling methods. The last point is so important in any material handling program because your building is the limiting factor as to

how far you can go. If your company is planning the construction of new plants or warehouses, be sure the building is planned around your material handling program. Don't bring your Material Handling Engineer in after the building is completed.

Our program is still in its infancy. We have a long way to go and only the surface has been scratched on the potential possibilities in the merchandise business. I am convinced that not only new methods but new equipment will be developed as our program progresses.

From an address delivered at the Second Annual Industrial Packaging and Materials Handling Forum, Chicago.



HIGH QUALITY PALLETS OF SEASONED HARDWOOD

Standard double face non-reversible pallet.

"Send us two more carloads."

Customer reception of pallets from our new pallet plant located at Goodwater, Alabama, has been most gratifying. One new customer wrote, "They are the best pallets we have ever had—or seen. Enter our order for two additional cars." Our southern plant is operated at our own sawmill, so we control production of our pallets from tree to finished product. Seasoned hardwood makes for reduced weight without any sacrifice in

strength. The result is a pallet that stays put and has eye appeal.

We produce also lightweight softwood pallets even lighter in weight than our seasoned hardwood pallets. They are suitable for handling light bulky merchandise.

For emergency orders or small initial requirements for exper-

imental purposes, we still produce the same quality pallets for quick delivery by truck from our Chicago plant, at slightly higher cost than our carload lot prices at our southern plant.

INDUSTRIAL LUMBER. We specialize in large boxes and crates.

Ask us for prices on your individual specifications. We'll reply promptly. Call Ivan Anderson, Manager, Pallet Division. Phone Pullman 0221.

PALLETS
Sectional Bins
and Lumber

Sterling Lumber and Supply Co.

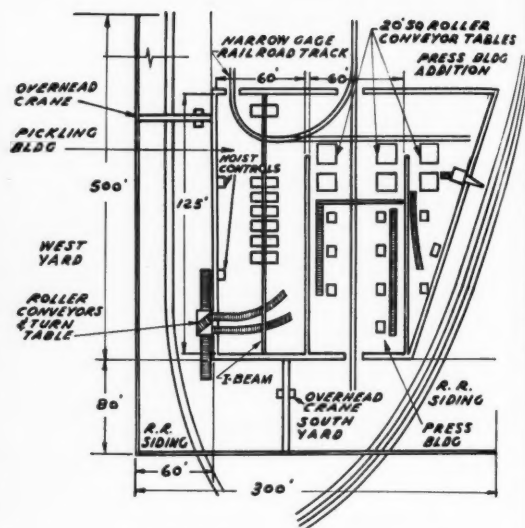
11900 S. HALSTED ST.

CALL PULLMAN 0221

CHICAGO 28, ILL.



One of two sheet steel storage yards. Ten-ton bridge cranes handle stock in both yards.



Flow sheet shows yard areas in relation to building facilities housing primary operations.

**CRANES, HOISTS,
GRAVITY CONVEYORS**

When production buildings get cramped...

CAN YOU MOVE STORAGE OUTSIDE?

This manufacturer of automobile body frames moved outside and added overhead and roller conveyor equipment to meet greater production needs. Results: 1. A threefold greater storage area. 2. Gain of 12,500 square feet of needed manufacturing space. 3. A 100 per cent increase in productive capacity.

HANDLING of sheet metal in primary operations in the production of automobile and truck frames at one time constituted a major problem for the Midland Steel Products Company, Cleveland. Former methods, involving use of extensive inside storage facilities, were slow and expensive, and inadequate for present stepped up production demands. Through the use of outside storage areas

covered by bridge cranes in conjunction with roller conveyors and hoists, production has been increased by 100 per cent, storage facilities increased by 70 per cent with no increase in handling costs. Aside from the assembly and welding operations, frame production involves considerable press work, including stamping, forming and similar operations.

The sheet steel is received in five

to seven-ton bundles in two rectangular storage areas located at the southwest corner of the plant property. These abutt at right angles to form an "L". The longer portion is the west yard, roughly 500 feet long by 60 feet wide. The base of the "L" is formed by the south yard, 300 feet long by 80 feet wide. The combined area of these yards amount to 54,000 square feet, designed to accommodate 40,000 tons. The yards are served by three rail spurs, two parallel tracks crossing the south yard, while the third extends north the length of the west yard. Truck deliveries of sheet bundles are made to both yards at the southwest corner. These areas and the building facilities are shown in the accompanying flow sheet.

Each yard is served by a cab-controlled 10-ton bridge crane on a 30-foot-high runway which spans

the width of the storage area, extending the full length. Note that the two shorter yards make possible shorter hauling distances for each crane than would be the case with one 800-foot yard—a distinct advantage in this operation.

The bridge cranes—with a two-man yard crew for each—are used to (1) unload sheet bundles from gondolas and from highway trucks, (2) spot the bundles in storage piles, (3) transfer the raw material to gravity roller conveyors whence the raw sheet steel is moved into the pickling building for processing. The five to seven-ton bundles (varying in size from 60" by 90" to 21" by 359") are stacked to heights of eight to ten feet.

Former storage of sheet bundles was done in a craneway located within the plant. This operation required a storage area of 50 by 250 feet. The on-the-floor handling in use at that time required the raw material to be hauled a distance of about 400 feet to the pickling building, and a comparable haul from pickling to production. Maximum capacity under this arrangement rarely exceeded 100 tons per eight-hour shift.

Aside from the very important gain of 12,500 square feet of manufacturing space, the use of outside storage areas in connection with the conveyors and turntables increased production capacity to more than 200 tons per eight-hour shift, and reduced by 50 per cent the former intermittent handling.

The pickling building, extending north and south along the west yard, is located within the triangle formed by the "L"-shaped storage areas. The sheet bundles are moved into the building through an entrance located at the southwest corner. Housed in a shed at this point is a 20-foot turntable with a 40-inch-wide double roller bed. Two 30-foot lengths of double gravity roller conveyors are separated by the turntable, one conveyor extending north into the west yard, and the other projecting into the south yard. Bundles are spotted on the inclined conveyors by the bridge cranes operating in each yard. The material is advanced along the conveyors to the turntable which in turn feeds two curved 40-inch roller conveyors of

40 and 50-foot lengths. These extend fan-wise across the end of the pickling building. The bundles are advanced along either conveyor to the working area where the sheets are transferred to pickling racks.

The pickling operation is performed at the center of the building in six tanks sunk almost to floor level. The curved sections of roller conveyor, previously mentioned, move the bundles to the transfer point south of the tanks where the sheets are individually loaded on racks of acid proof metal which are 48 inches wide by eight feet long. The sheets are supported in a vertical position by 60-inch acid proof posts located along the side of the racks. Additional posts are used to secure the sheets in four sections across the width of the carriers. Spacer hooks are dropped over alternate plates, to keep them separated during the immersion. A rack load of 60 to 64 sheets is made up in less than five minutes' time with a man working from each end of the bundle. The empty racks are located on the floor immediately adjacent to the waist-high conveyors. The loaders, one at each end of the rack, use hooks to remove the top sheet so that it slides off the bundle, landing on the rack below in a vertical position. This is an example of the efficiently engineered methods observable throughout the operation.

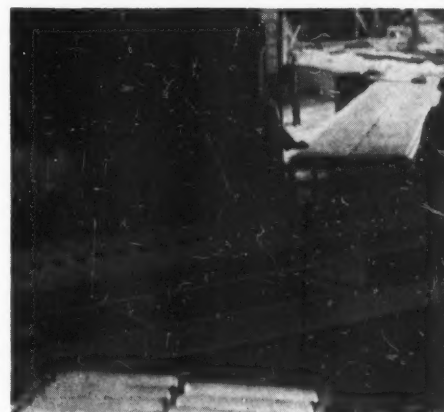
Overhead Rack Handling

Five pickling racks are kept in process by means of two 7½-ton cable-operated remote-controlled hoists and five independent spread-

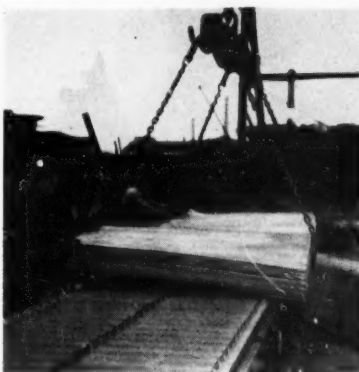
ers. The hoists travel on overhead "I" beam trackage which extends the length of the building at the center. The hoists are powered for horizontal travel and vertical lift by means of cables fixed to power units located outside the building (at track ends). This installation was required because the corrosive nature of the acid fumes prohibits use of direct-powered overhead equipment. A separate set of controls is used for each hoist, stations being located about midway along the west wall, in positions to give the operators unobstructed vision.

The south hoist moves the racks from the loading area into the first tank. The north hoist transfers the carriers through the pickling cycle and to the unloading point at the north end of the room. The cycle is completed by the north hoist carrying the empty rack to a trans-

Turntable transfers sheet from yard conveyors to similar units extending across end of pickling building.



Bridge crane lowers sheet to gravity roller conveyor which moves stock to pickling building.

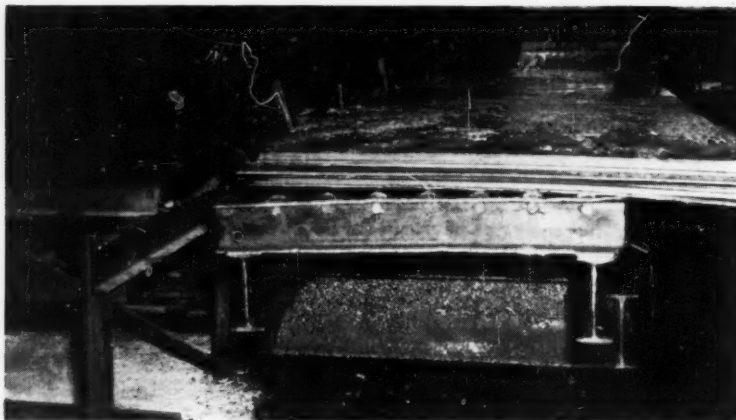


Pickling rack with load. Bar extending from spreader guide load into pickling tanks.



fer point where the south hoist picks it up and returns it to the loading point. While one hoist loads three acid tanks, the second

enters at the northwest corner, passing between the pickling tanks and the rack unloading point, and after a 180 degree turn leaves



Laterally located rollers on car enables sheet to be slid to 20' square conveyORIZED press table.

one advances the material through the rinse and oil baths, to unloading. This two-hoist team explains the present high production obtained.

The racks are equipped with four one-inch acid proof lifting rods fastened to the sides. Heavy chain links attached to the rods are used to hook them to the independent pickling hoist spreader. The latter unit (also constructed of acid proof metal) is made of cross members—two lateral units containing hooks from which the racks are suspended, and cross bars located above the lateral unit. The cross bars (see photos) rest across the edges of the pickling tanks and support the loads in the solutions.

Rack Unloading—Transfer

The north hoist, as mentioned earlier, transfers the processed material to the unloading point at the extreme north end of the building. Here the sheets are removed from the racks and transferred to flanged wheel equipment for movement to production departments. Rack-to-car movement of the sheets is accomplished by means of the north hoist. (The sheets are dropped to wooden spacers on the floor which permit entry of the sling.) Double-truck flat cars, equipped with draw bar attachments, are hauled by tractor to either the main factory building or to an adjacent press department for processing.

The cars move on a track which

through the center of the adjacent press building. A tangent spur is for the movement of cars from the loading point to the adjoining press building. Cars used to feed this department are constructed with a bed of lateral-mounted roller conveyor sections.

The adjoining press building is 125 feet long by 60 feet wide. The spur from the pickling building extends across this department about 40 feet from the north end. Two

1400-ton presses which perform primary stamping operations are located to the south of the spur. Each of the presses (one at each side of the building) is separated from the spur by a 20-foot-square conveyORIZED press table. These roller conveyor sections extend from the spur to the presses. The roller topped cars are moved into position beside the tables and the sheet loads are slid onto the table tops. Thus, delivery of the loads to the presses by means of the conveyORIZED cars and the roller conveyor-topped press tables is done with a minimum expenditure of time and effort.

Stampings are removed from the rear of the presses and stacked on wooden spacers. Load units of stampings are removed by means of a hoist traveling on an "I" beam track which extends across the width of the building. The loads (from either press) are deposited by the hoist on flat cars operating on a track which bisects the building. A tractor hauls the loaded cars to the main building where further stamping and forming operations are performed.

Scrap Utilization Efficient

In the primary stamping operation performed by the two 1400-

(Turn to page 62)

Roller conveyor (left) used to move scrap to successive stamping operations in press department.



G-E RECTIFIERS HANDLE TOUGH JOB AT PRATT & WHITNEY AIRCRAFT

***Efficient chargers help to keep batteries
of 100-truck fleet in top operating condition***

Using more than 100 electric trucks to move materials in its huge plant at East Hartford, Connecticut, Pratt & Whitney Aircraft operates its battery department two full shifts a day to keep equipment running.

Playing an important role in this daily maintenance operation, General Electric copper-oxide battery chargers have proved their ability to deliver the type of heavy-duty service that is required, and to deliver it with the efficiency and the economy that keeps materials handling costs low.

At Pratt & Whitney Aircraft, as at many other modern plants, the use of General Electric rectifiers for electric trucks is based on performance records. Experience has shown that this hard-working equipment is easy to maintain, and is always reliable. It needs little attention on the part of its operators, and can be counted on for long service.

Many Advantages for Any User of Electric Trucks

Perhaps you, too, have a problem that involves more efficient flow of materials.

We would like to show you how the strategic spotting of General Electric rectifiers can help — by keeping unnecessary truck movement at a minimum, by eliminating traffic jams, and by increasing truck operating time.

Let us send you a copy of our useful booklet, *Aids To Economical Faster Materials Handling*. Write to Section A77-736, Appliance and Merchandise Department, General Electric Company, Bridgeport 2, Connecticut.



General Electric's copper-oxide rectifiers are installed in convenient, space-saving banks. Batteries are easily connected to receive their big, off-duty charge.

GENERAL  ELECTRIC

ON THE



PALLET

NEWS · VIEWS · TRENDS

FOR months, the National Association of Manufacturers and its president, Earl Bunting, have appealed to the manufacturing industry to reduce prices wherever possible, in the belief that the American people would benefit more from a first round of price reductions than a second round of wage increases. In mid-April the NAM sent a questionnaire to its membership to determine just to what extent member companies, in response to the NAM and Bunting appeals, had been able to reduce prices on any of their products. Replies were received from 5,742 members, or about 36 per cent of the entire NAM membership, which produces over 80 per cent of the manufactured goods of the United States. Of those replying, one in five reported price reduction on one or more products since the first of the year.

* * * * *

CARLILE & Doughty, Inc., manufacturers of C & D batteries for industrial and automotive use, held its annual meeting of stockholders on April 14. The following men were elected directors to serve for the ensuing year: Leon A. Doughty, Frank S. Carlile, William A. Carlile, John F. Rittenhouse, Phil S. Harvey.

* * * * *

SUCCESSFUL completion of a \$100,000 test of ride control equipment for railroad freight cars, designed to drastically reduce the "triple damage" of lading losses, car repairs and roadbed maintenance, was announced by Brouwer D. McIntyre, president of the Monroe Auto Equipment Company. The reduction was effected through cutting down shock and vibration—principal "triple damage" causes—by as much as 93 per cent through the use of direct-action hydraulic shock absorbers similar to those on new railroad passenger cars and automobiles. Adaptations and installations for all freight cars now in service and all new freight cars now being built were developed during the test, and were scheduled to be introduced by Monroe to the nation's railroads at the exposition of the Railway Supply Manufacturers Association in Atlantic City, June 23.

* * * * *

TITLE to industrial property located on Clifton Avenue at the Winton Place Railroad Station, Cincinnati, has been acquired by The E. W. Buschman Company, engineers and manufacturers of conveying equipment. The property is a one and two-story building containing 65,000 square feet of floor space and has complete heavy manufacturing facilities. Products manufactured by the Buschman Company have been progressively expanded to include portable, overhead

trolley belt, and roller conveyors as well as many other types of special conveying equipment for large or small plants.

* * * * *

THE Market Forge Co. has issued an attractive brochure commemorating its 50 years of progress. The first several pages show plant views of decades ago, as well as products made in the early years of operations. The unfolding story is one of continual growth, with text and photos reflecting the technological advances of the modern era. A spread is devoted to the wartime products that were made by Market Forge. A tribute to the personnel and a special message by President Leo M. Beckwith form the concluding part.

* * * * *

THE Missouri Pacific Lines paid out in 1946 \$3,308,071 in settlement of loss and damage claims and is "going to do something about it." Here is how chief executive officer Paul J. Neff outlined plans for a remedy. Teams are to be formed which will be composed of selected station, yard, train and traffic forces on each of the system's divisions. Following a period of intensive instruction in the latest loading and packaging methods, each team, accompanied by a claims prevention field man, will go out on the line to consult with station, yard and train forces and to transmit to them the knowledge they have gained. Conferences also will be held with shippers to secure their co-operation in securing better packaging and loading of car-lot movements. Statistics compiled by the company's claim forces show that approximately 80 per cent of the damage claims result from car-lot movements loaded by the shipper and unloaded by the consignee, while only 20 per cent of the damage occurs in less-car-load movements. The plan outlined here is to be a continuing campaign.

* * * * *

THE Systems and Procedures Association of America announces the following changes in the national board of directors. The board now consists of: president, H. Kenneth Marks, J. K. Lasser & Co., New York City; first vice-president, Frank Hoffman, Standard Oil Co., (N. J.), New York City; second vice-president, Vincent S. Shirar, SKF Industries, Inc., Philadelphia; treasurer H. John Ross, Continental Can Co., New York City; secretary, Raymond B. Crean, Baldwin Locomotive Works, Chester, Pa.; chairman of publications committee, Eugene Walters, Publicker Industries, Inc., Philadelphia; managing director, Joseph S. Covell, Joseph S. Covell & Associates, Philadelphia.

HOW AUTO MAKER CUTS SHIPPING COSTS

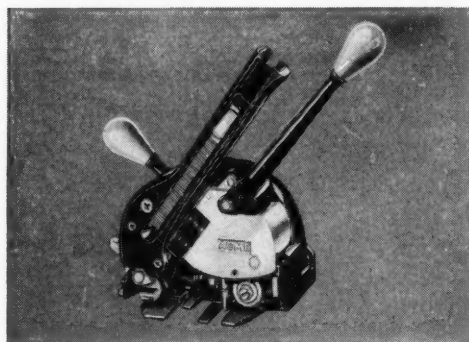
Nash Motors Division uses low-cost Acme Steelstrap to speed units to production line.

The Milwaukee Parts Plant, Nash Motors, Division of Nash-Kelvinator Corporation, relies upon Acme equipment and material to handle its bulk packing problems.

Acme Shipping Specialists helped Nash engineers devise packing operations that materially reduced costs and facilitated movement and safe shipping of units between plants. (See the three examples of better shipping at lower cost on this page.)

Acme Shipping Specialists will be happy to consult with your company on specific or general problems of packing and shipping. They can help you, and without obligation.

Find out how Acme Steelstrap users in many industries now show a *profit* in their shipping rooms. Send for free case history booklet, "SAVINGS IN SHIPPING."

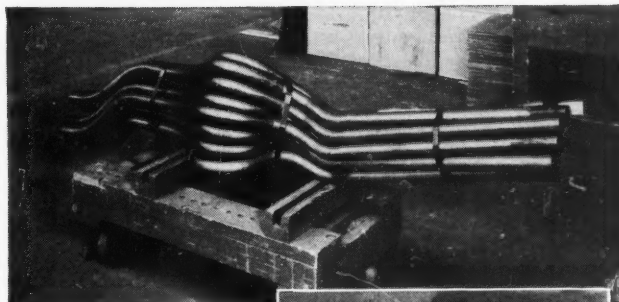


NEW! More savings ahead with Acme No. 3 Steelstrapper—the lightest tool made. Magazine holds 100 seals. Tensions, seals, and cuts the strap in one operation. Small base requires only 5-inch strapping surface. Two levers working in opposite directions make for excellent balance and easy handling.

ACME STEEL COMPANY

NEW YORK 7 ATLANTA CHICAGO 8 LOS ANGELES 11

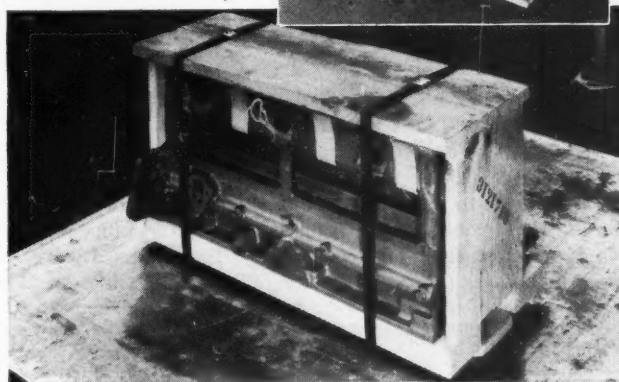
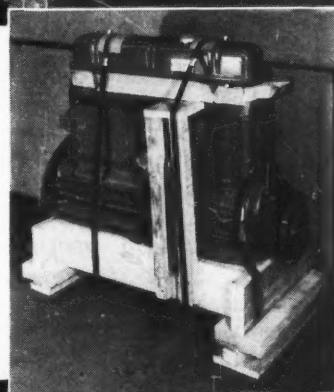
JULY, 1947



50% SAVED! Acme Uni-Pak, in which a bundle of tailpipes is wrapped with three bands of Acme Steelstrap, reduced packaging costs about 50%.

BETTER! Acme Steelstrap holds wood members in place and helps protect breather pipes. Steelstrap and two short pieces of strip steel firmly hold engine to skid.

75% SAVED! Present cost of packaging Nash engine cylinder blocks with Acme Steelstrap is only 25% of old method . . . labor and material saved!



MAIL THIS COUPON TODAY!

Acme Steel Company, Dept. F-77
2838 Archer Avenue
Chicago 8, Illinois

Please send me a copy of your case history booklet, "SAVINGS IN SHIPPING."

Name

Company

Address

City Zone State



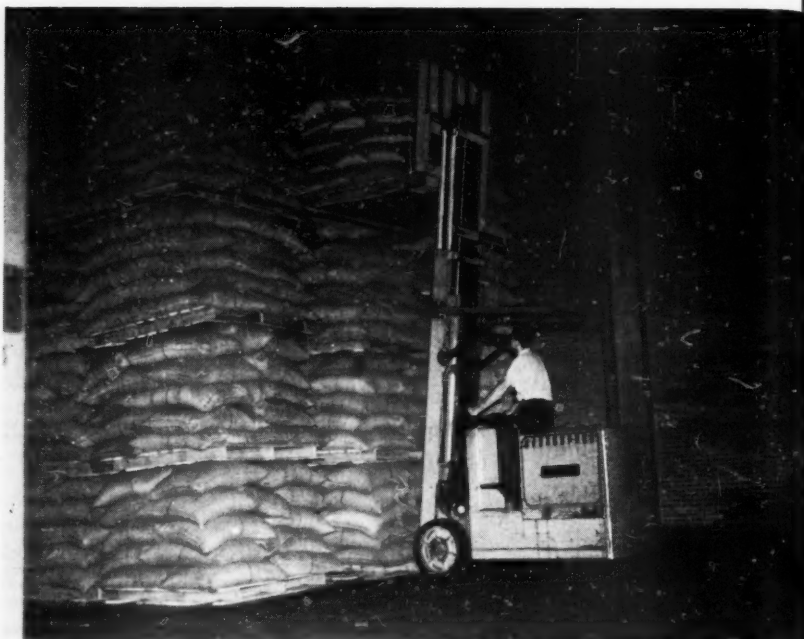
**ACME STEEL CO.
CHICAGO**

Low cost handling is . . .

BACK OF THE PRICE POLICY

**PALLETS
TRUCKS-CONVEYORS**

Here's a multi-story building that was originally designed for only a fraction of the volume handled today. Modern methods have increased tonnage production per manhour 50 per cent and multiplied available square footage by two through the use of cubic space. You will find other vital data in this report.



This is fork truck with specially designed lift. Height to underside of top pallet is 15½ feet.

THE Jewel Tea Company distributes tea, coffee, specialty grocery items, cosmetics and housewares direct to homes by means of some 1,700 route salesmen operating in 43 states. The company's methods are somewhat different from those of other house-to-house or route organizations. The busi-

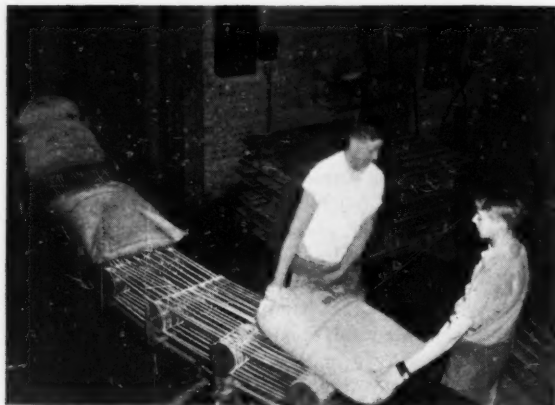
ness is owned and controlled entirely by it. It owns the merchandise, the trucks, and the salesmen are company employees. The headquarters office and main plant is at Barrington, Illinois, 35 miles northwest of Chicago. The main plant ships the goods to 77 branch warehouses, and the 1,732 routemen call

on 850,000 American homes every two weeks. Sales in 1946 amounted to almost \$89,000,000, an increase of about 30 per cent over the previous year. And the business is growing.

This dollar increase naturally means a corresponding increase in the volume of material handled at the Barrington headquarters plant, where a palletization program was instituted about two years ago.

One of the principal items handled in terms of tonnage is coffee, which is distributed both to Jewel Food Stores (a separate department) and to the branch houses that supply the vast network of routes. In 1946 approximately 35,000,000 pounds of coffee were roasted and shipped from Barrington.

Within recent years a new coffee warehouse was constructed just east of the main building, both con-



Bags of coffee travel from car to pallet over this conveyor with minimum effort and handling.

nected by a passageway. The one-story structure is about 300 feet long by 100 feet wide, with a ceiling of 22 feet. Green coffee in bags arrives in cars, which are spotted at one of seven doors. For unloading purposes, a 26-foot-long portable conveyor of the flexible type is used. Its carrying surface consists of endless springs threaded over grooved rollers which are on 20-inch centers. Power is supplied by a motor-driven center roller. The conveyor, shown in one of the photos, is mounted on two wheels in the center and on 4-castered trucks on each end. The tubular frame supporting the conveyor has joints at 20-inch centers operating in a horizontal plane, thus permitting the line to be arranged in 90-degree curves, S-turns, or any other shape that may be necessary. The machine can be locked to the floor.

The receiving end is 10 inches above the floor, requiring minimum lifting effort for the bags being unloaded. The discharge end is 30 inches high and is adjustable vertically, and is equipped with a metal plate which can be adjusted at an angle for sliding the bags off.

The 132-pound sacks of coffee are placed 54"x62" hardwood pallets, 25 bags to the load. The full pallets are tiered by a 4,000-pound fork truck which has a lift of 190 inches, designed especially for the Jewel Tea Co., in order to utilize the high head room. The loads are

tiered four high (almost 16 feet to the underside of the load). This means that 13,200 pounds of coffee are stored in a floor area slightly over 23 square feet.

The size of the pallets was considered in relation to the distance between posts and the size of the 132-pound bags. The 54"x62" dimension permits the pallet loads to be stored between posts with no waste of space. The full capacity of the warehouse is about 70,000 bags.

From storage, the pallet loads are transported to the south end of the area where the batch mixers are located. The pallet loads are arranged in semi-circular design, and within this space the bags for the individual batches are selected with minimum man travel on 4-wheel flat trucks. One circuit completes a full assortment for each batch of 12 bags. The hand trucks are wheeled a short distance to the dumper, and from this point the coffee is handled by a fully automatic conveying system which carries the material through cleaning and roasting, then packaging.

The continuous system involves the use of bucket elevators, screw conveyors, gravity chutes, and some vacuum lines. The movement is from cleaning on the ground floor level to the roasters on the third floor. After grinding, also done here, screw conveyors deliver the material to flow bins on the second

floor, which feed the packaging machinery on the ground floor.

Packaging Mechanics

In the packaging department, high-speed automatic machinery maintains a balanced flow between production and shipping. Four separate lines are in operation for as many types and sizes of containers. A typical example is the line for the three-pound cartons, which delivers 27,000 completed packages per 7½-hour day and requires only three operators and a mechanic. Their positions are indicated in the accompanying flow sheet.

One operator services the box making machine and the scale or filling machine—the first two parallel lines that form part of the S-shaped layout up to the wrapping machine. The duties of this operator include the feeding of the shells to the box maker. From the lining machine (indicated), the lined cartons travel over a narrow belt to the electric scale. This fills six cartons at a time 10 times a minute. The full cartons travel around a curve to the third parallel line that completes the S. Here the containers pass through the top sealer and then move on to the compression unit, as shown.

The weight check mechanism, next in line, is of particular interest. This consists of a compressed

Line from three-pound coffee sealer. Cases travel via booster to palletization area.



Palletized cases are moved by hand truck to near-by order filling. A handling for every job.



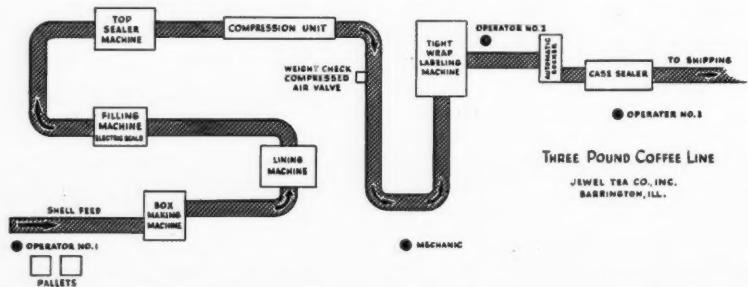
air valve activated by a switch. If an underweight or empty package passes in front of the valve, the solenoid switch will cause the valve to set off a blast of air that blows the package off the line.

As can be seen from the flow sheet, the full and sealed boxes next pass through the tight-wrap labeling machine, which marks every label with a date code. (This is the station of the second operator.) Another assurance of fresh coffee is of interest. Since the route salesmen take the orders for coffee (as well as other items) two weeks in advance, the company roasts and packages only the amount already sold. This means that the product is not held in storage, that it is shipped practically as fast as it is produced.

From the tight-wrap labeler a 9½-inch belt line moves the finished packages into the automatic shipping-case packer, where the third operator is stationed. She supplies the containers to the machine, which automatically deposits the full cases on a conveyor belt feeding to the sealer and compres-

sion unit. This operator also inspects the packages coming off on her side, while the second operator watches the other side of the boxes.

tion point of the two lines, a mechanically operated gate prevents jam-ups. If two cases approach the extended gate arms at nearly the



Sketch shows layout of packaging department. Stations of operators and mechanics are indicated.

The disposal line is continuous with the packaging line. The sealed cases travel over an inclined section of gravity rollers to a booster belt which conveys the units to an overhead powered roller line (about 150 feet long) that delivers to the palletization station in the shipping department.

A second booster conveyor also feeds the shipping room conveyor from a parallel packaging line (for two-pound cartons). At the junc-

same moment, the first case passing through will lock the other arm momentarily. This arm is released as soon as the first case has passed through.

At the end point of the line the cases are palletized on 42"x42" hardwood pallets, which was decided on as the optimum size for the numerous types of containers handled. The only item not handled on these is 100-pound sacks of flour. For this product a 42"x48"

LORAIN CUTS COSTS

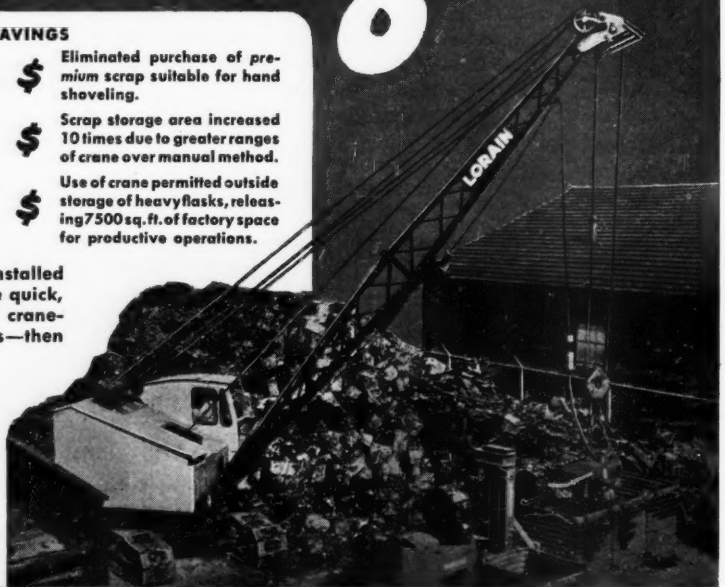
8 ways...

OPERATION	SAVINGS
\$ Unloading scrap from cars to stockpile (per car) 36 man hours	\$ Eliminated purchase of premium scrap suitable for hand shoveling.
\$ Loading scrap from stockpile to charging boxes (per day) 13 man hours	\$ Scrap storage area increased 10 times due to greater ranges of crane over manual method.
\$ Unloading sand from cars to stockpile (per car) 28 man hours	\$ Use of crane permitted outside storage of heavy flasks, releasing 7500 sq. ft. of factory space for productive operations.
\$ Loading sand from stockpile to truck (per 60 tons) 21 man hours	
\$ Car demurrage \$300 to \$400 per month	

A well-known Northern Ohio foundry recently installed its first crane—a Lorain TL-20. The results were quick, startling and positive. Check these savings of crane-handling materials over man-handling methods—then look out the window at your yard and see what you can save.

Labor saving, cost cutting Lorain cranes are available as 2-speed crawler units or with rubber-tire mountings (self-propelled or two-engine types). Your local Thew-Lorain distributor can supply complete information. Call him today.

THE THEW SHOVEL COMPANY
Lorain, Ohio



thew. **Lorain**
Reg. Trade Mark

CRANES • SHOVELS
DRAGLINES • MOTO-CRANES

pallet with a snag-proof surface is being developed.

The pallet loads of coffee are moved by pallet hand trucks to the adjoining order selection area, the maximum haul being well within 50 feet.

The section of the west building taken up by coffee order selection is approximately 40x100 feet. From here the pallet loads are moved by motorized pallet hand trucks on hauls ranging between 50 to a maximum of 200 feet. This concludes the handling of the coffee.

Pattern of Material Flow

The introduction of the order selection department touches on the Jewel Tea Company's over-all operation, since this section receives the goods from storage areas, from production and packaging lines as well as from inbound carriers.

With a headroom of 116 inches available, the pallet loads are double-decked in this entire area. Material sent from the various manufacturing lines on the several floors is of course on pallets. Shipments arriving on highway trucks and freight cars are palletized at the receiving point.

The order clerks travel through the aisles on motorized hand pallet trucks, selecting the number of cases from the stockpiles as indicated on the shipping requisition form (sent in by the branch offices). The completed loads are moved to one of the seven car-loading doors on the east side of the building or to one of five truck loading doors on its north end. After checking, the loads are moved by pallet hand trucks into the outbound carriers. These hauls are likewise within 50 feet.

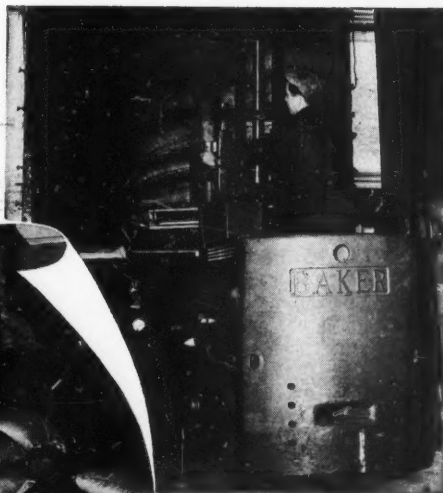
The movement of the material flow in the multi-story building follows a typical pattern, with specific handling devices assigned to each type of operation best suited to it. Basic in this floor-to-floor movement are two three-ton elevators, at the north and south ends of the building. With the exception of coffee, already described, the flow principle applies whether the product be cake mix, packages of tea, cream shampoo or cinnamon.

From the production or packaging lines the completed pallet loads are moved by pallet hand trucks

BAKER TRUCK

multiplies manpower by
10!

A Philadelphia coffee roasting company uses a Baker Fork Truck for handling bagged coffee in five separate operations—reducing tasks formerly requiring hours of hard, physical effort, to minutes of safe, light work. Besides achieving substantial man-hour savings, the truck more than doubles warehouse capacity by tiering palletized loads two and three high.



● Coffee is received in highway trucks, in bags (not palletized) weighing 150 to 200 pounds. Three men, working a full day formerly unloaded approximately 750 bags and piled them

in the warehouse. Today, one operator with the Baker Truck, could easily unload 2500 bags. The truck first lifts the empty pallets onto highway truck from floor level. After bags are placed on pallets, the fork truck unloads and tiers the palletized units in the nearby warehouse area.

Since only a fraction of the truck's time is required for unloading and tiering, it is free to transport pallet loads of green coffee, in correct proportions for the desired blend, and spot them alongside the roasting station. This operation formerly took the full time of one man. Roasting completed, coffee is weighed off in 80 lb. bags and again palletized, so that the truck can move them either to temporary storage or load them directly into vehicles for shipment.

Whether your problem is handling bags, cartons, drums, bulky parts or practically any other material, the fork truck—pallet combination can save you money. Let the Baker Material Handling Engineer show you how.

BAKER INDUSTRIAL TRUCK DIVISION

of The Baker-Raulang Company

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In Canada: Railway and Power Engineering Corporation, Ltd.

Member: Electric Industrial Truck Association



Baker INDUSTRIAL TRUCKS

short distances to collection stations that are immediately adjacent. When sufficient production has been assembled, motorized pallet hand trucks transport these loads on the longer hauls to one of the two elevators. In this manner the stocks are delivered to reserve stores in the basement. Here motorized hand trucks pick off the loads and move them to the stockpiles, where a fork truck double-decks them. The movement to the first-floor order assembly depart-

ment is accomplished in a similar manner, in reverse order. (Some production may of course be routed directly to the first floor if necessitated by shipping requirements.)

While the building was originally not designed for power handling, the coordination of modern handling devices with the elevators speeds the greatly augmented tonnage through receiving, storage, production, packaging, order assembly and shipping on the several

floor levels. Note, too, that fork trucks, pallet hand trucks, and motorized pallet hand trucks are used for the specific tasks for which they were designed. Two high-lift or stacking type motorized pallet hand trucks are now on order and will be employed in relieving the fork trucks now in use.

Fifty Per Cent More Production

The adoption of the pallet-fork-truck method has helped solve the company's biggest problem. At present about 250 per cent more business is handled in the plant than the original building was planned for. The removal of coffee storage into a building of its own spelled a great relief. But that still left a record volume of other merchandise to be handled in limited space, as Plant Superintendent R. M. Johnson pointed out. And the construction of additional building facilities proved to be an impossibility. The utilization of cubic space by means of the pallet method was therefore the big factor in solving the problem.

Not only has double-decking multiplied the square footage so used by two, but untold manhours of single case piling have likewise been eliminated and used for more productive efforts. In this connection, a before-and-after comparison in the coffee bag operation is particularly illuminating. The loads were previously run out of the cars into the warehouse where one man at each end of the bag was necessary to pile the material 10 bags high. This was just half as high as present stacking, which meant that half of cubic area remained unused.

Another important advantage of the pallet program is the time saved during inventory taking. With hand piling, it was necessary to count every bag individually. Now one-third of the people formerly required can take inventory of pallet loads in one-half the time—and the result is more accurate.

The over-all benefit of the program can be expressed in a figure furnished by the company's Manufacturing Accounting Division. The tonnage handled per manhour in 1946 shows a 50 per cent increase over that in 1942 (before palletization). While it would be difficult to estimate the dollar value of the space utilization factor, it certainly



Hooper portable conveyors are the perfect solution to your problems of material handling. Increase your production and cut cost with HOOPER power and gravity conveyors designed to take care of a wide variety of jobs.



HOOPER FLAT TOP BOTTLE CHAIN CONVEYORS are designed for carrying containers, jars and bottles in dairies and food processing plants. Adjustable guard rails.

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ranks equally in importance with the increase in tonnage handled per manhour.

Both factors mean lower per ton handling cost. And lower costs, important to any business, are especially vital in a house-to-house business which guarantees that the selling price of its goods will be identical with prices charged in local retail stores, or lower. It is easy to see that low-cost handling at Barrington has a vital relation to such a price policy, which affects the success of the 1,700 routemen that are the backbone of the business.

(See the new section "Packaging Mechanics," page 29, which describes handling procedures used by the company in packaging jars of cosmetic products.)

You May Win

FLOW Magaine is offering \$1,500 in awards for papers on material handling cost reduction projects. See the contest announcement on page 78. Read the simple rules, then send in for your entry blank.



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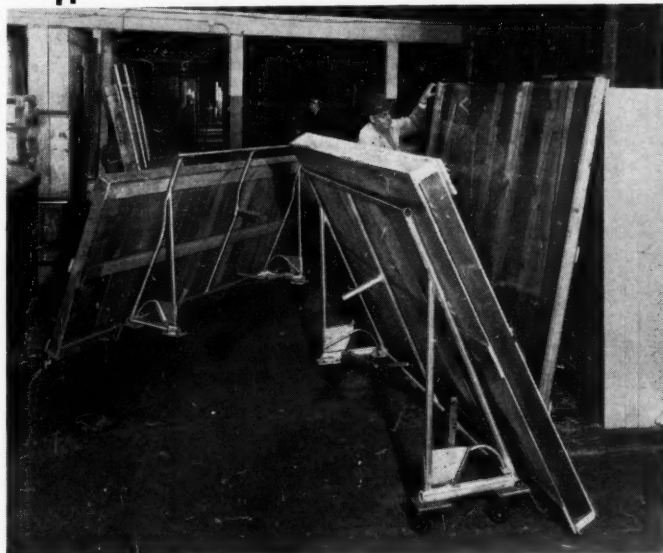
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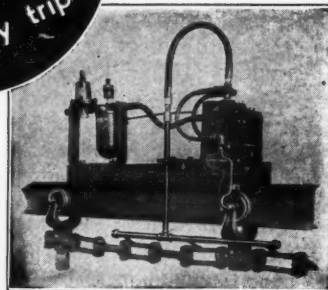


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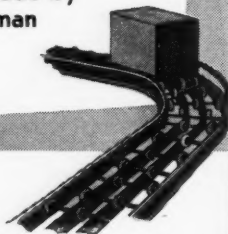
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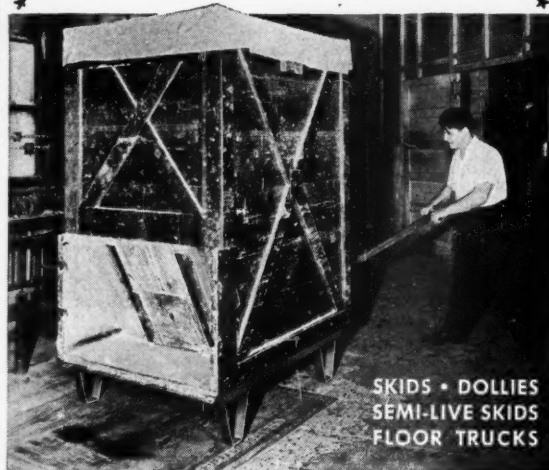
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LETTERS TO FLOW

To FLOW:

No Headaches

With FLOW at hand, many headaches can and will be reduced in material handling. FLOW Magazine contains much valuable information in solving material handling problems.—M. J. Cummings, Foreman Rock Island Arsenal, Rock Island, Illinois.

To FLOW:

Paper Dolly

We have read with interest your article "Handling Mechanics at Popular Mechanics" on page 34 of the May issue. We are particularly interested in the paper dolly shown in the upper picture illustrating this article.—G. W. Vennels, Manager, C. M. Lovsted and Company, Ltd., Vancouver, B. C.

To FLOW:

Scoop Truck

We are subscribers to your publication and have looked through your April issue. We noticed on page 42 a shovel truck which we consider could be of interest to us. It seems to be very strongly built and at the same time reduced to the smallest volume possible.

We would thank you to let us know the name of the firm manufacturing this equipment so that we could ask them to make us an offer for such vehicle, or give us the name and address of their agents in Belgium.—J. Tubbax, Manager, Northern Shipping Service S. A., Antwerp, Belgium.

To FLOW:

"Looking Forward"

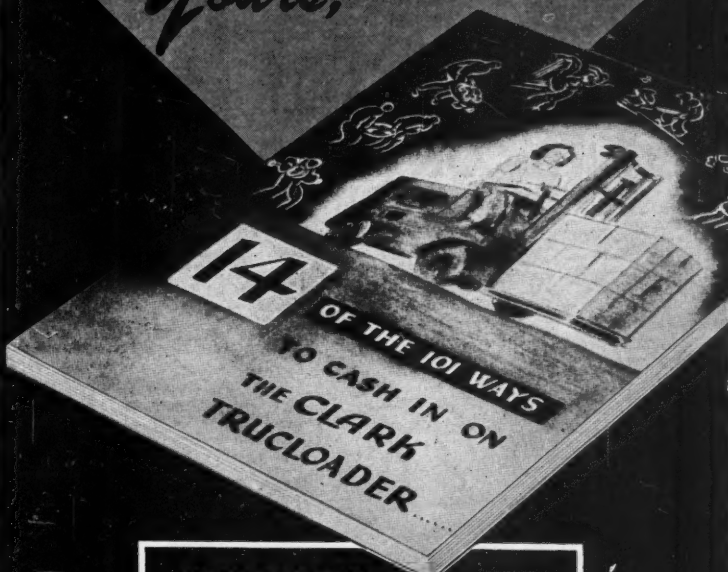
In the past we have read your publication with interest. We are looking forward to reading future issues with continued pleasure and profit.—J. R. Wells, Kingston-Conley Electric Co., North Plainfield, N. J.

\$1,500 In Prizes

You may win cash by submitting a paper on a material handling cost reductions project. See the contest announcement on page 78.

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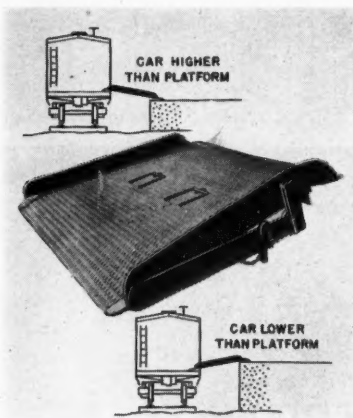
Make yourself more valuable...turn out more work with less time and effort: Have a factory-trained D.B. packing and marking man analyze your shipping room procedure. Profit by his suggestions. Others have. No obligation. See your phone book under "Stencil Cutting Machines." Or write Diagraph-Bradley Dept. E. 3745 Forest Park Blvd., St. Louis 8, Mo.



For additional information on these products, write Dept. 5, Flow Magazine, 1240 Ontario St., Cleveland 13.

BRIDGE RAMP

NP77—Designed by the Elizabeth Iron Works for use with fork trucks, this ramp is said to have a load capacity of 15,000 pounds. It is equipped to be transported to location between platform and freight car or between two freight cars on the forks of any standard lift truck.

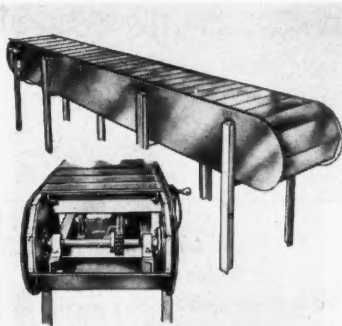


The lift handles drop into place to form a flush riding surface. Sizes and types of ramps are made to span gaps from five to 58 inches, with height differentials up to seven inches. The riding surface is said to be of non-slip steel construction, reinforced with shock plates at the corners. Side stringers add rigidity and act as safety guards.

ALUMINUM BELT CONVEYOR

NP78—A pre-fabricated, all-aluminum, belt conveyor is manufactured by the Patron Transmission Co. It is stated that all components such as chain, belt, sprockets, channels, angles, frame and other parts are constructed of heat-treated aluminum alloy. Due to the rust and corrosion resistance of alumi-

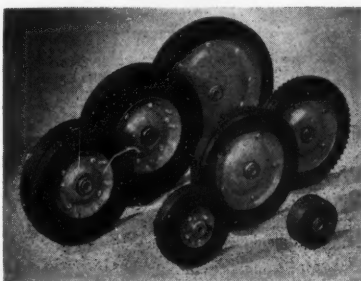
num, this unit is claimed to be well suited for food products and chem-



icals. It is available in widths from six to 60 inches and heights from 15 inches. Shipping units are five feet long. Other features claimed by the manufacturer are: speeds up to 150 feet a minute, load capacity 250 pounds per square foot, pulling load 6,100 pounds, speed reducer and reversible control.

RUBBER-TIRED WHEELS

NP79—A complete line of rubber-tired wheels for industrial and domestic use is offered by the Champion Iron Works. In a range of sizes from four to 14 inches, and diameters of the tire sections from 1 $\frac{3}{4}$ to three inches, these wheels are said to have sealed and welded

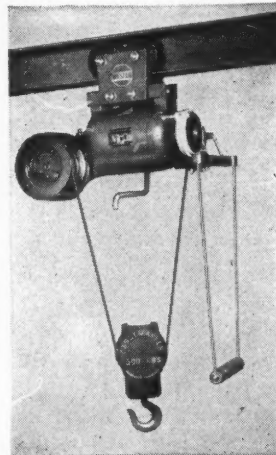


ball bearing hubs which cannot lose the balls or get out of line. The

tires are identified by well known brand names and can be demounted with ordinary hand tools, the company states.

ELECTRIC HOISTS

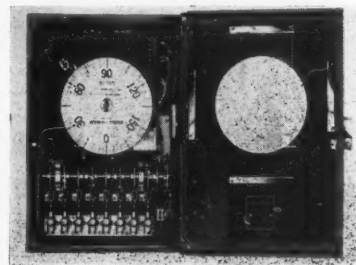
NP80—The Master Electric Company announces new features for its Cablemaster and Speedmaster hoists. One of the features is a new control which enables the operator



to control the hoist with one hand while guiding the load with the other. The Cablemaster is equipped with a gear motor and is available in capacities up to 1,000 pounds. The Speedmaster is available in capacities up to 6,000 pounds.

CYCLE CONTROLLER

NP81—A multiple-cam time cycle controller, developed by The Bristol Co. is designed to provide accurate timing in plant processes where a number of factors are involved. The controller is said to actuate or engage at the correct time in each cycle. Time measurement and pilot valve operations are han-



dled by separate mechanisms. The company states that the separation of these two basic functions made possible a design that gives accurate timing of the factors under

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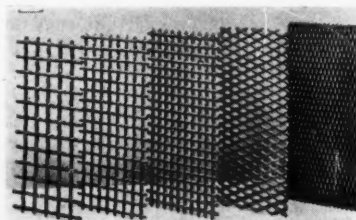
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the right tire . . . the right service
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control, high speed and torque for pilot valve operation, and flexibility. Time impulses are transmitted electrically. The cams can be individually adjusted and their setting does not require a fine adjustment in order to obtain accurate results, the release states.

MATERIAL HANDLING SEPARATORS

NP82—Woven wire screens completely covered with rubber, for material handling purposes, are offered by Automotive Rubber Company, Inc. These separators are made to protect parts which have been plated, painted or precision finished so they will not become scratched, marred or disfigured by contact with metal surfaces. The mesh separators likewise permit



drainage. The company states that the separators can be furnished to fit bottoms of tote pans, conveyor baskets or pallets and can be covered with hard, semi-hard, soft natural rubber or synthetic rubber to meet specific conditions encountered.

CONVEYOR BELTING

NP83—The Food Machinery Corporation's Anderson - Barngrover Division announces a flexible, flat-top, steel conveyor belting, designed to meet the requirements of canners, packers, bakers, bottlers and many other industries. Constructed of No. 302 (18-8) stainless steel, the belting comes in a choice of either solid-top links or links with 1/4 inch perforations for drainage and ventilation. Ridges on the underside are said to add strength and provide a continuous

CUT PRODUCTION COSTS with a **SHOPLIFTER**

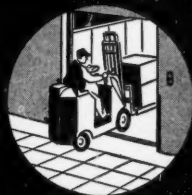
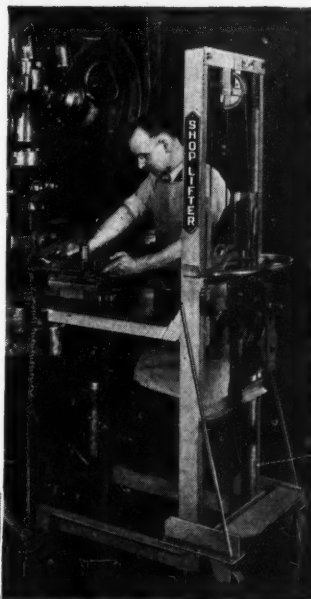
One man can handle heavy dies up to 500 pounds alone. Easily moved about. Also handy for loading and unloading trucks and miscellaneous lifting jobs. Platform 24 in. x 24 in. Lift of platform 4 ft. 6 in. Price \$157.50 (foot operated floor lock optional, \$10.00 extra). Heavier capacities available up to 5000 pounds.

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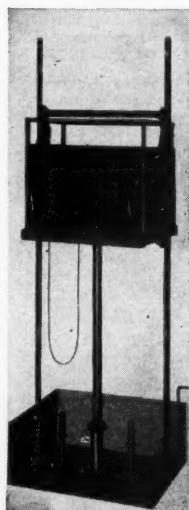
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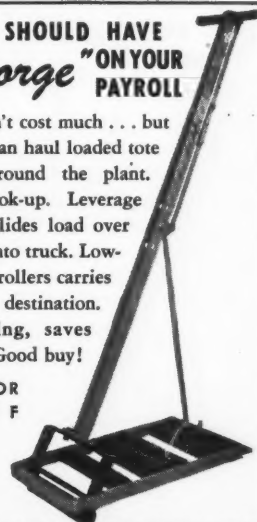


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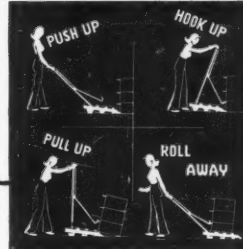
He doesn't cost much . . . but he sure can haul loaded tote boxes around the plant. Easy hook-up. Leverage handle glides load over rollers onto truck. Lower set of rollers carries truck to destination. No lifting, saves energy. Good buy!

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Should the decision of competent engineering advice favor the installation of a fork truck-pallet system for your particular materials handling problem, you will probably be surprised to find the capital investment in pallets exceeds that of the mechanical equipment by as great as 2½ to 4 times. Past experience in the purchase of other types of mechanical equipment has taught you that for long life and low maintenance costs the equipment must be adequately designed and reliably manufactured.

May we suggest you apply these principles to your pallet purchases?

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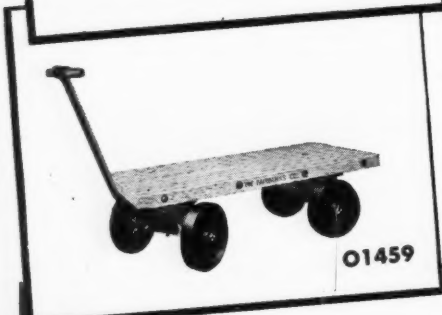
MQ 2448



S2742A



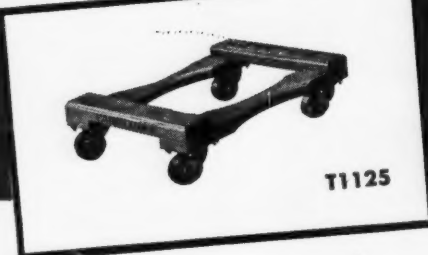
S4681



Q1459



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T1125

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With this unusually large variety to choose from, you can pick a Fairbanks Truck that will give you the job-design advantages you want, plus the savings in time and money that always go with standard equipment. For complete information about the entire Fairbanks line, or details about any specific truck, write The Fairbanks Company, 393 Lafayette St., New York 3, N. Y.; 520 Atlantic Ave., Boston 10, Mass.; 15 Ferry St., Pittsburgh 22, Pa.; 748 M&M Bldg., Houston 2, Texas.

MQ 2448, Commander Steel Frame Platform Truck. Hardwood platforms securely bolted between heavy angle irons; ends and sides armored to assure long life. Heavy duty, double ball bearing, semi-steel casters provide easy rolling and steering. Sizes 24" x 48" to 36" x 72".

S2742A, Commander Steel Frame Platform Truck. Identical in general construction features with the Q type truck, but is Tilting or Center Balance Type for quick turning in small space, around sharp corners, etc. Turns in its own length, pushes from either end. Sizes 27" x 42" to 30" x 60".

S4681, Factory Truck. Hardwood construction throughout, ball bearing swivel type casters. Balances on center wheels. A lightweight, durable, easy-to-operate truck that handles light, bulky loads with unusual facil-

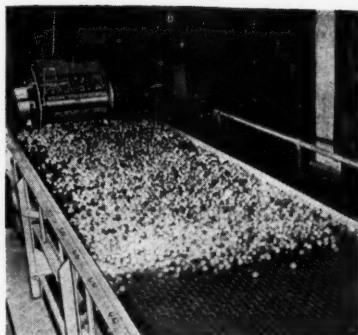
ity. Wooden stakes are removable. Sizes 24" x 48" to 36" x 60".

Q1459, Heavy Duty Wagon Truck. Capacity four tons. Extra strong construction throughout, including two 3" x 1" solid iron cross sills. Wheels are broad faced for easier starting and rolling under full load. Sizes 36" x 72".

500-7, Lift Jack Platform Truck. Lifts and rolls easily with heavy loads. Ideal for small spaces, eliminates many handling processes. Powerful jack operates by merely pulling handle down. To remove jack, handle lifts up, jack rolls out. Size 30" x 48".

T1125, A rugged wooden frame dolly with side bars shaped to conform to the hand. Four ball bearing swivel casters. For quick, easy handling of refrigerators, furniture, boxes, long cases.

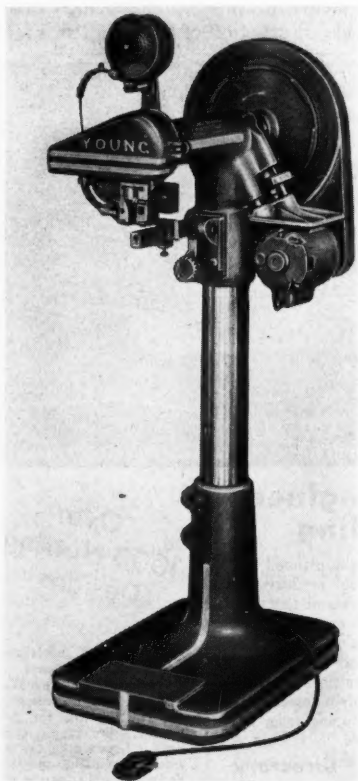
fairbanks trucks



level surface for head and tail pulleys and support rollers. In addition to stainless steel, the belting can be supplied in electro-galvanized steel. It can be supplied in any length and in widths running in multiples of seven inches.

WIRE STITCHING MACHINE

NP84—The N.A. Young Company offers a new stitcher for fastening operations, ticketing, and general box work. The stitcher uses steel wire and is said to operate over an adjustable speed range of 150 to



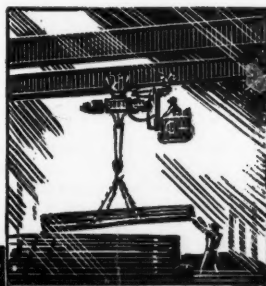
350 stitches a minute. A control knob allows immediate adjustment of machine speed to the speed of the operator or to the type of work being done. The stitching mechan-



With so many ways to manufacture, process and fabricate, businesses may be different insofar as shop practice is concerned. But regardless of whatever competitive advantages you enjoy, your material handling problem is common to all industry. Heavy loads must be picked up, moved and deposited with speed, safety and economy.

Shepard Niles electric hoists have, for many years, been handling loads of from $\frac{1}{8}$ to 20 tons smoothly, easily and efficiently in every type of industry.

America's oldest builder of electric hoists and cranes offers you a selection from over 5,000 styles and sizes to enable you to get the hoist best suited for your handling job. Without obligation, trained, experienced Shepard Niles engineers will study your handling operations and recommend a hoist to do the job as you want it done.



Shepard Niles electric cranes are made in types and sizes for every kind of industrial lifting and moving. If you have a heavy handling problem, there's a Shepard Niles to do the job. Our engineers will study your need and recommend the best crane for you. No obligation, of course.

Shepard Niles
CRANE & HOIST CORPORATION

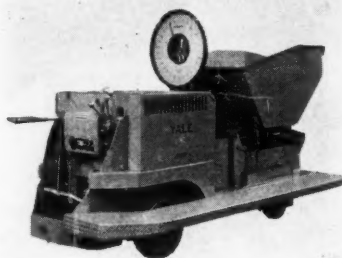
466 SCHUYLER AVE. • MONTAUR FALLS, N. Y.

ism is tripped by electric solenoid action controlled by a button floor switch; an automatic brake eliminates power drag between stitches, the release states. All main operating points in the mechanism ride on sealed-in ball bearings. Parts needing lubrication are all accessible from the outside with an oil can or Zerk lubricating gun. Reversible parts in the stitcher head are said to be easily replaced when worn. It is available in either a floor or bench model. Both models are powered by a 1/4 HP motor.

SCALE-AND-DUMP TRUCK

NP85—The Yale & Towne Manufacturing Co. announces a new combination of three different handling tools in a single mobile unit for: weighing out batches, transporting them about the plant, and dumping them into furnaces, tanks or hoppers. The unit embodies (1) a shock-absorbing dump-bucket, (2) a platform scale, and (3) a standard load-carrier truck. Called a "Portable Batching Scale-and-Dump Combination", the truck is

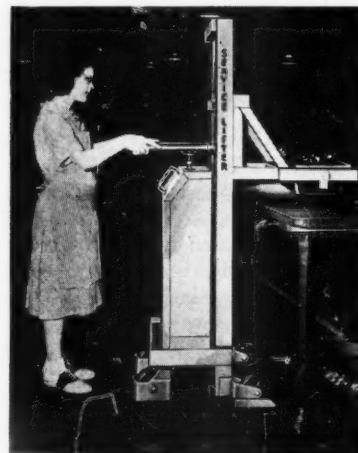
said to have found utility in enamel frit making, chemical compounding, and electric-furnace metallurgy. A 40-cubic-foot dump hopper is supported on the platform of the scale by means of four heavy coil springs which is claimed to give the scale protection against shocks. The scale has a 24-inch diameter shatter-proof glass-protected dial which



is graduated in five-pound gradations and records loads weighing up to 3000 pounds. The truck is said to embody the same advantages of simple control, speed, and maneuverability which are incorporated in general purpose load carriers.

TOTE PAN LIFTER

NP86—Efficient handling of tote pans is claimed to be accomplished with the Tote Pan Lifter, manufactured by Service Caster & Truck Corporation. Controlled by a push button on the handle and powered



with two standard 6 volt batteries, the lifter has a capacity of 150 pounds, overall height of 5 foot 9 inches and lifting height of 54 inches. Protection of the operator's feet

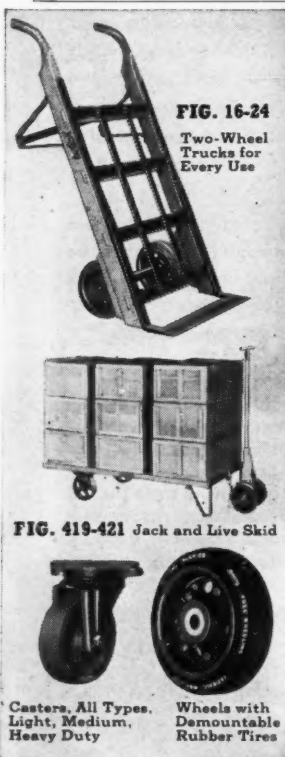


FIG. 16-24
Two-Wheel
Trucks for
Every Use

FIG. 419-421 Jack and Live Skid

Casters, All Types,
Light, Medium,
Heavy Duty

Wheels with
Demountable
Rubber Tires

Ask Nutting Engineers

FOR ADVICE ON MATERIALS HANDLING



FIG. 1136

One of Many Sizes and Styles of Bar Handle Platform Trucks

NOW is the time to Engineer your Materials Handling

Your materials handling system needs to be just as carefully planned and engineered as your production set-up, or the design of your products. A planned layout may well be the difference between profit and loss, between smooth-flowing operation and a time-wasting series of bottlenecks. Take advantage of the seasoned experience and valuable advice of a Nutting Engineer. Because the all-around adaptability and versatility of Nutting Trucks has never been excelled, he can advise you on the proper use of trucks with overhead or floor conveyors . . . assembly or production line use . . . interdepartmental use . . . warehouse or shipping room use . . . as well as situations where only trucks should be used.

LOOK in your Classified Telephone Directory to contact your nearest Nutting Sales Engineer, or write to us direct. Ask for Bulletin 47-G.

Over
1000 Nutting
Designs

56 years of specialized, continuous experience in building materials handling equipment is embodied in the Nutting line for your benefit. We supply every need in floor trucks, casters, wheels—including specially designed trucks for specific needs.

NUTTING TRUCK & CASTER COMPANY

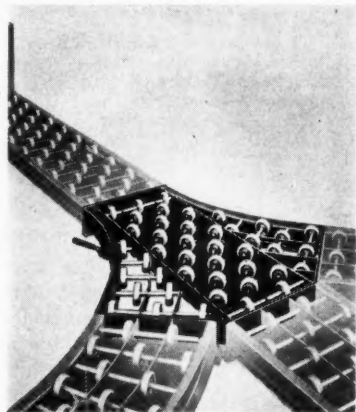
1601 DIVISION STREET WEST, FARIBAULT, MINNESOTA



is provided by safety hoods mounted on the caster running gear.

THREE-WAY CONVEYOR SWITCH

NP87—Claimed to be new in principle, this three-way switch for roll or wheel conveyors is offered by the E. W. Buschman Co., Inc. The switch is said to adjust to provide flow in any of three directions; left,



right and straight ahead. A hand lever is used to change the direction of flow. The switch weighs 56 pounds.

FLOOR DRESSING

NP88—A top dressing for asphalt tile and linoleum that is said to eliminate waxing is being produced by the Rock-Tred Corporation. Two types are available: one for application over asphalt, the other prepared for use on linoleum. The manufacturer describes this floor dressing as a Pyroxylin base material which may be applied with an ordinary paint brush. It is said to dry within 10 minutes and to withstand oil, mild acids and alcohol.

WORK TABLE

NP89—Adjustable, and said to conform to the basic principles of motion economy, a new table is offered by the Haskell Manufacturing Company. Claimed to save time, effort, motion, this Work-Flow Table is designed for use in offices, assembly lines, and home work shops. A hand crank on the right hand side adjusts the table to the most comfortable position for the worker, tall or short. Working heights extend from 26½ inches minimum to 37 inches maximum height. The table is constructed of

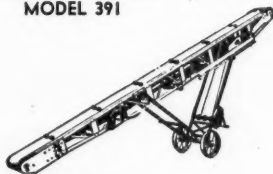
Farquhar

PORTABLE CONVEYORS

FOR . . . *Loading and Unloading*
Stacking and Piling
Better Materials Handling

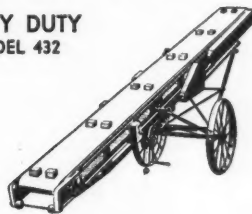
SAVE TIME • SAVE MONEY

FEATHERWEIGHT MODEL 391



FOR HANDLING
Packages up to 125 pounds. Ask
for Bulletin No. 391.

HEAVY DUTY MODEL 432



FOR HANDLING
Packages up to 500 pounds. Ask
for Bulletin No. 432.

PACKAGE HANDLING

• Unlimited use in all industries.

• Designed for horizontal or elevating service—for use singly or in tandem.



PORTA TROUGH MODEL 334-T

• Carries bags, boxes, crates, etc., at speeds to suit requirements.

AGGREGATES HANDLING

Utility conveyor Model 334-T is recommended for handling crushed stone, sand, gravel, coal, coke, etc., from hopper bottom cars to storage, storage to trucks or from cars to bins. Lengths and widths to suit requirements.

COAL

• Combination "Ace" and Car Unloader speeds unloading of hopper bottom cars and eliminates labor of shoveling material over from car hopper.

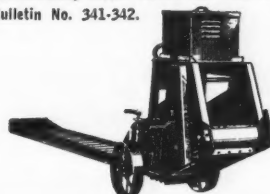


"ACE" MODEL 334-3
Most widely used Coal
Conveyor on the market.
Ask for Bulletin No. 334-3.

• Many other models for piling and storage.

CAR UNLOADER MODEL 341

For unloading hopper bottom cars. Ask for
Bulletin No. 341-342.



ASK FOR REPRESENTATIVE TO CALL REGARDING YOUR REQUIREMENTS.

MATERIAL HANDLING CONVEYORS
Hydraulic Presses, Farm Equipment, Special Machinery.

Farquhar



PORTABLE MACHINERY
DIVISION

A. B. FARQUHAR CO.

206 NORTH DUKE ST. YORK, PA.
616 WEST ELM STREET CHICAGO 10, ILLINOIS

A CURTIS AIR HOIST



**Stepped Up Production 50%,
Eliminated Workman Fatigue—
Proved, Fast, Safe, Dependable**

A prominent cooperage company states the above facts about their use of a Curtis Air Hoist used in washing reclaimed metal barrels in a steam and caustic soda bath.

Here's additional proof of the labor saving advantages of Curtis Air Powered Equipment. In plant after plant, Curtis Air Hoists are cutting labor costs, saving money and speeding production routine. They offer:

- Low first cost, low maintenance
- Smooth, fast, accurate control
- Finger-tip operation
- Immunity to overloads
- Capacities to 10 tons

Write for Form C-7 for full information on Curtis Air Hoists, Air Cylinders and Air Compressors.

CURTIS PNEUMATIC MACHINERY DIVISION

of Curtis Manufacturing Company

1909 Kienlen Avenue, St. Louis 20, Missouri

CURTIS PNEUMATIC MACHINERY DIVISION H555A
of Curtis Manufacturing Company
1909 Kienlen Avenue, St. Louis 20, Missouri
Please send me Form C-7 on Curtis Air Hoists, Air Cylinders
and Curtis Air Compressors.

Name.....
Firm.....
Street.....
City.....Zone.....State.....

93 Years of Precision Manufacturing

new improved

**SERVICE
ELECTRIC
HYDRAULIC
LIFTER**

**IMMEDIATE
DELIVERY**



CAPACITY 1000 LBS.
Also available in larger capacities.

**Handles Heavy Loads With
Speed, Ease and Safety**

With the Service Electric Hydraulic Lifter any light socket in your plant is a power source for lifting up to 1000 lbs. . . . as high as 8' 8" . . . by simply pressing a button. This is the practical equipment to lower handling costs as you lift heavy loads more efficiently . . . to make the handling of dangerous loads easier and safer for your men.

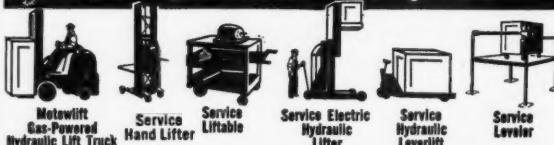
With twin roller lifting chains, either of which will safely hold the load . . . push button control . . . safety valve to prevent overloading . . . all the other features listed here . . . this new better Service Electric Hydraulic Lifter deserves a spot in your plant.

Send for Descriptive Circular.

**Features
Like These
Will Cut Your
Handling
Costs**

- Lifting speed 10 feet per minute.
- Lowering speed 30 feet per minute.
- Platform lift 8' 8".
- Height collapsed (to clear short doorways) 6' 5".
- Height extended 10' 6".
- Platform size 36" x 30" — Larger sizes available.

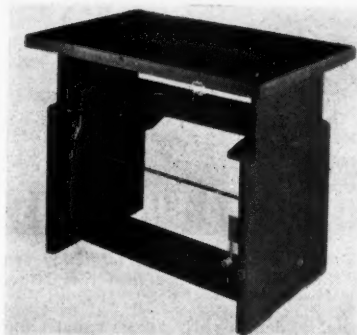
Cost-Saving Service Materials Handling Products



SERVICE CASTER & TRUCK CORP.



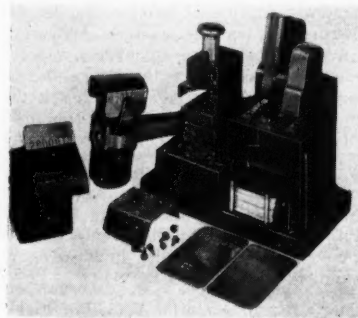
Executive Offices: Albion, Michigan
Plants at Albion, Michigan and Somerville 43, Mass.
Representatives in all Principal Cities



heavy-duty plywood with steel gears, and will hold a working load up to 300 pounds. It has a tempered masonite top.

TAG EMBOSSE

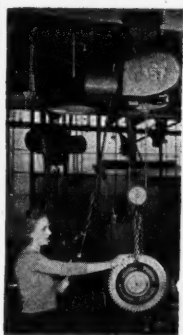
NP90—A metal tagging and tag-embossing outfit, primarily designed to provide a permanent and efficient method of identifying billets during storage in yards prior to the rolling operation, is announced by M. E. Cunningham Company. The new tagging outfit is said to have numerous warehousing and industrial applications. After embossing with a light hammer blow, the tag is placed in a fixture which bends it to fit over the hammer face and into the hammer clamps provided, at the same time punch-



ing a special heat treated nail through the tag. The hammer used is a regular three pound Safety Engineer's style tool.

CONVEYOR FOR BULK MATERIAL

NP91—A portable flight conveyor for conveying materials at steep inclines is announced by Material Movement Industries. According to the manufacturer, this conveyor will handle bulk material such as coal, dirt, ashes, grain, and similar products at inclines up to 45 degrees. Two-inch flights bolted to (Turn to page 63)

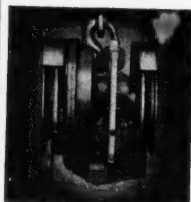


CONCO TORPEDO ELECTRIC HOISTS

- ★ 250-, 500- and 1000-lb. Capacities.
- ★ Hook, Bolt or Trolley Suspension.
- ★ Positive Electric Brake. Enclosed Limit Switch.
- ★ Push Button Controlled, for Safe, One-Hand Operation.



TODAY'S TOP VALUE IN HOISTS



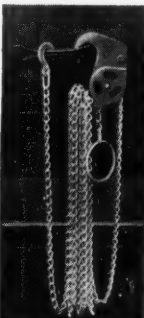
Sturdy cast iron double drums balance load, eliminate overlapping cable. Simple, rugged construction employs only two gear reductions—one worm gear and one spur gear. Worm is of high quality steel forging, hardened and ground, operates on Timken radial thrust bearings. Best grade chilled phosphor bronze used for worm gear. Spur gears machined from forged steel blanks with full depth teeth. All gear shafts operate on ball bearings, fully enclosed, in a bath of oil.

The CONCO TORPEDO ELECTRIC HOIST is fast, compact, powerful, easy-to-operate. Double drum construction centers and balances load, assuring an even lift, freedom from sway, greater safety and efficiency for the operator. Write today for detailed specifications and prices. Prompt delivery.

CONCO ENGINEERING WORKS
38 GROVE ST. MENDOTA, ILLINOIS

SAFER—FASTER BETTER way to open balky box car doors!

MONARCH ONE MAN CAR DOOR OPENER



One man can open the most binding, balky box car door with the Monarch Car Door Opener. Get greater safety . . . speed loading and unloading schedules . . . order an ample supply to fill your needs today!

- No strained muscles. No slips or falls. No broken arms, legs or mashed fingers. No fatalities. No time wasted. No "gangs" needed. No time loss.

ONLY \$22.50 EACH
F.O.B. Bowerston

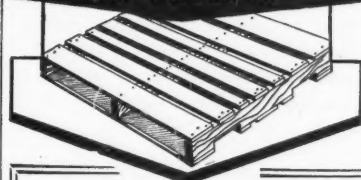
Write for free descriptive literature.

Mining Safety Device Co.

Dept. F-7, Bowerston, O.



EVERYTHING
YOU DEMAND
IN PALLETS

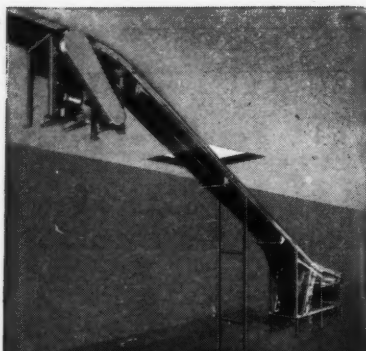


- STRENGTH •
- TOUGHNESS •
- LONG LIFE •
- ECONOMY •

Tell us your needs! Whatever your materials handling problem we can supply the answer as far as pallets are concerned. Address inquiries to

GRASTY PALLET CO.

ORANGE, VA.
TELEPHONE 2541

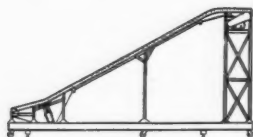


THIS STREAMLINER 30° INCLINED BELT CONVEYOR

SPEEDS

FLOOR-TO-FLOOR MATERIALS HANDLING

It operates either up or down at a constant speed of 45 feet per minute. Rollers can be "SET HIGH" for oversized packages, or "SET LOW" to provide a protective guard rail on both sides of the conveyor. Unit, available in standard sizes up to 30" wide, has durable, rough top rubber belt . . . a manual take-up for belt slack . . . may be equipped with free-rolling casters for portability . . . or can be supported from one floor. Write for detailed information today.



PORTABLE



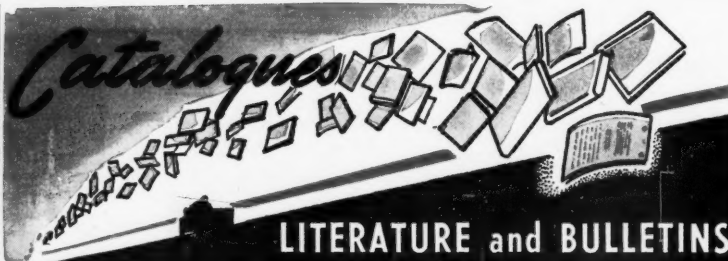
SUPPORTED FROM ONE FLOOR

Our more than 25 years' experience is at your service to help you solve your materials handling problems.

HARRY J. FERGUSON Co.

WHEEL • PORTABLE BELT • BELT
AND ROLLER GRAVITY CONVEYORS

121 WEST AVE., JENKINTOWN, PENNA.



The publications featured on these pages were written by experts. They are FREE publications. To obtain these use the postcard bound into this issue.

342—Hardwood Pallets . . . The General Box Company has released a four-page, informative folder on the construction and use of hardwood pallets. Valuable data are given on the construction of pallets, showing the as-

sembly, deckboards, stringers, nails and chamfers. Illustrations show use of pallets in the handling of bags, boxes and other types of material.

(Continued on page 59)

OPPORTUNITIES

Men wanted Jobs wanted Lines available

Rates: for "Positions Wanted" \$3.50 minimum, limit 25 words. For all other classifications \$3.50 minimum for 25 words, each additional word 10c; bold-face type or all capitals, \$6.00 minimum for 25 words, each additional word 15c; limit 50 words. Box addresses count as five words. All insertions are payable in advance.

REPRESENTATIVE WANTED

Manufacturers' representative of Materials Handling Equipment in Wisconsin territory seeks agency for manufacturer of steel bins, racks and stacking boxes. Box 7447, FLOW.

Manufacturers

Do you want outlets for your Material Handling equipment in the following territory—Western Pennsylvania, Eastern Ohio and West Virginia? We have a real live organization calling on all the trade in this territory and can handle several additional items. Write Box 7247, FLOW.

MEN WANTED

FORK TRUCK & PALLET SALES-MAN—An exceptional opportunity for a man with a previous successful sales record calling on Industrial Plants, preferably in the Philadelphia area. The distributors on the East Coast for a fine new gasoline fork lift truck have an opening available to an aggressive salesman capable of earning a managerial position in this new department of our company. Previous materials handling experience will be beneficial. Box 7647, FLOW.

FOR SALE

FOR SALE: Complete modern operating pallet plant located in small Louisiana town on main line railroad. Lumber in unlimited quantities, can be purchased cheap. Plenty of labor. Price for plant \$12,000 cash or terms to responsible parties. Replies strictly confidential. Will give reason for disposal of plant. Box 7847, FLOW.

FOR SALE: Lewis-Shepard Electric Telescopic Stacker. Capacity 4000#.

Lifting Height 6'6". Practically new. Central Fibre Products Co., Hutchinson, Kansas.

Bosworth Coal Unloader—used only three months. Sumter Textile Mills, 257 Fourth Ave., New York 10, N. Y.

LINES WANTED

Lines wanted: Established manufacturers representative wishes to represent additional manufacturers of material handling equipment in Georgia, lower South Carolina and eastern Alabama. Have own warehouse and can stock. We have three men on the road and can give full coverage. Have had over twenty years' experience in sales in this territory. Box 7547, FLOW.

Agencies for sale of nationally distributed line of portable wheel and roller conveyor, wanted in Boston, Pittsburgh, Indianapolis, Memphis and Denver. Write advising lines already handled. Box 7147, FLOW.

Specialists in Material Handling Field—with well trained sales force and experienced estimating engineers—desires Lines of Handling Equipment for sale and distribution in Eastern Pennsylvania, New Jersey and Delaware. Headquarters located in Metropolitan Philadelphia. Box 7747, FLOW.

POSITION WANTED

Situation Wanted

Manager, 45, over 20 years' experience public merchandise warehousing and marine terminal operations. Special qualifications in mechanical handling, processing and packing for export and domestic shipping. Complete knowledge operating, labor, sales, advertising, accounting, personnel, rate making, insurance, traffic and association work. Box 7347, FLOW.

343—Sheet Lifts . . . A sixteen-page catalog describing the many types of sheet lifters made by the Cullen-Friedstedt Co. Illustrations show the various lifters at work in mills, factories and warehouses, under all types of conditions. The last two pages of the catalog are devoted to engineering drawings and specifications.

344—Excavators . . . Six models of excavators for use in digging and moving material from ponds, rivers, or deep pits are described in a 20-page booklet by the Sauerman Bros., Inc. Illustrated with photographs of actual installations, the publication also contains information on excavating accessories.

345—Lifting Magnets . . . Use of round and rectangular magnets in lifting billets, ingots, pig, scrap and car wheels in scrap yards and foundries are some of the topics covered in an eight-page catalog by the Ohio Electric Manufacturing Co. Dimension and capacity charts on standard models are included.

346—Hand Trucks . . . A pocket-size catalog on hand trucks, tote boxes, baskets and trays has recently been issued by the Fibre Specialty Manufacturing Company. Trucks for use by textile mills, garment factories, department stores and laundries are among those illustrated.

347—Loading Lift . . . A hydraulic powered lift for loads up to 6,000 pounds is covered in a four-page brochure by the Globe Hoist Co. Designed to lift material to truck bodies, trailers, rail cars or from one floor to another, it has a lift height of 4½ feet.

348—Steel Strapper . . . Three models of heavy-duty steel strappers for use in carload bracing, palletizing and general work are shown in a two-color folder recently released by A. J. Gerard and Co. One page is devoted to anchor plates, drive screws, edge protectors and to other strapping accessories.

349—Conveyor Belts . . . A four-page catalog section on its line of conveyor belts, by the B. F. Goodrich Co. Featured is a guide on the selection of grades needed for a specific job. The section gives details on each brand of belting, as well as a list of the applications in which they are most commonly used.

350—Screw Conveyors . . . A 16-page folder by the Screw Conveyor Corp. It contains numerous capacity charts, specification tables and detail photos illustrating the company's line of screw conveyors. A description of various parts, tables of belt speeds, and bucket spacing are included as part of a complete coverage of the subject.

351—Pallets . . . A pallet catalog has been prepared by Acme Pallet, illustrating various types of pallets and their correct application for efficient palletization. Variations in pallet construction for handling all types of boxes, cases, bales, bricks, barrels, warehouse handling, machine parts, binning, stevedoring, etc., are covered in detail. Numerous photos illustrate the correct adaptations of standard types.

Deliver MORE Goods NOW...

ON RAPIDS-STANDARD CONVEYORS



Modern Brewers are finding it possible to move their bottled goods through washing, filling, capping, storage and delivery operations at higher speeds through the use of Rapids-Standard Conveyors. The steady flow of bottles and cases enables them to deliver MORE goods NOW.

Rapid-Wheel Conveyors operate by cost-free gravity to move cases and bottles automatically, thus saving the back-breaking job of lugging them from one operation to another. In stacking and loading, the Stevedore, Jr. takes the "grunt and heave" out of lifting and saves much valuable manpower.



Both Stevedore, Jr. and Rapid-Wheel conveyors are easily portable and can be set up in any part of the brewery at a moment's notice. Rapid-lock supports enable the conveyor to be adjusted for the right height and pitch for getting the maximum efficiency out of labor and equipment. Rapid-Wheel Conveyors are available in standard 5' and 10' sections for easy handling.

Write today for the latest descriptive information and bulletins. It costs you nothing to find out what Rapids-Standard can do for you to cut costs and save labor.



Manufacturers of
STEEL FORGED CASTERS - TRUCKS - CONVEYORS - POWER BOOSTERS

The Rapids-Standard Co., Inc.

Sales Division — 377 Peoples National Bank Bldg., Grand Rapids 2, Mich.

MONORAIL ALOFT...

(Continued from page 19)

Omaha, we will have to go through all the pits in order to find all the cargo for that city. The confusion would doubtless be no less in Denver, where again every piece would have to be rehandled and scanned. This picture is not necessarily overdrawn.

By contrast, note the orderliness and dispatch of the pre-loaded container method. In New York, at

the start of the flight, the San Francisco container is loaded in the back of the pit, with the Chicago containers closest to the doors. When the Chicago containers are removed at destination, those for Omaha, Denver, and San Francisco are put in their relative positions. Since all of this loading is done before arrival of the plane, no time is lost on the ground for sorting. At Denver the same procedure is used. Denver containers come off and Pacific Coast baskets take their place. This indicates that the

DC-6 carries a full complement of eight containers at all times, eliminating their being stacked and unused at any one point. If a container is removed at a stop—full or empty—another one has to be loaded in its place.

If a basket should have cargo for two destinations, that would be but a matter of sorting one-half of one container. And that is a much faster operation than sorting the contents of two complete pits.

As indicated, this method applies to the transcontinental flights. If bulk cargo is shipped on long hops—from San Francisco to Honolulu, for example—there is no need for the pre-loaded containers. But with the more frequent cross-country stops—and limited stop time—our present container method is a direct aid in maintaining schedules.

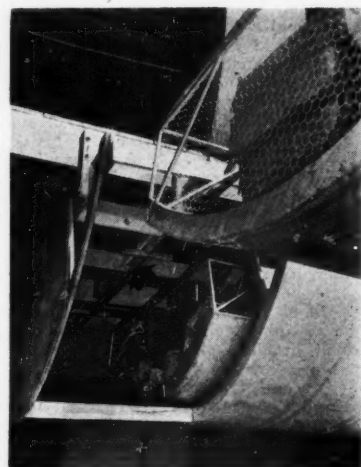


• Save Money,
Floors, Equipment
and Time by using

DARNELL CASTERS

DARNELL CORP. LTD.
LONG BEACH 4 CALIFORNIA

60 WALKER ST. NEW YORK 13 N.Y.
36 N. CLINTON CHICAGO 6 ILL.



Arrow points to transfer track, mounted on two monorails, that moves basket forward or aft.

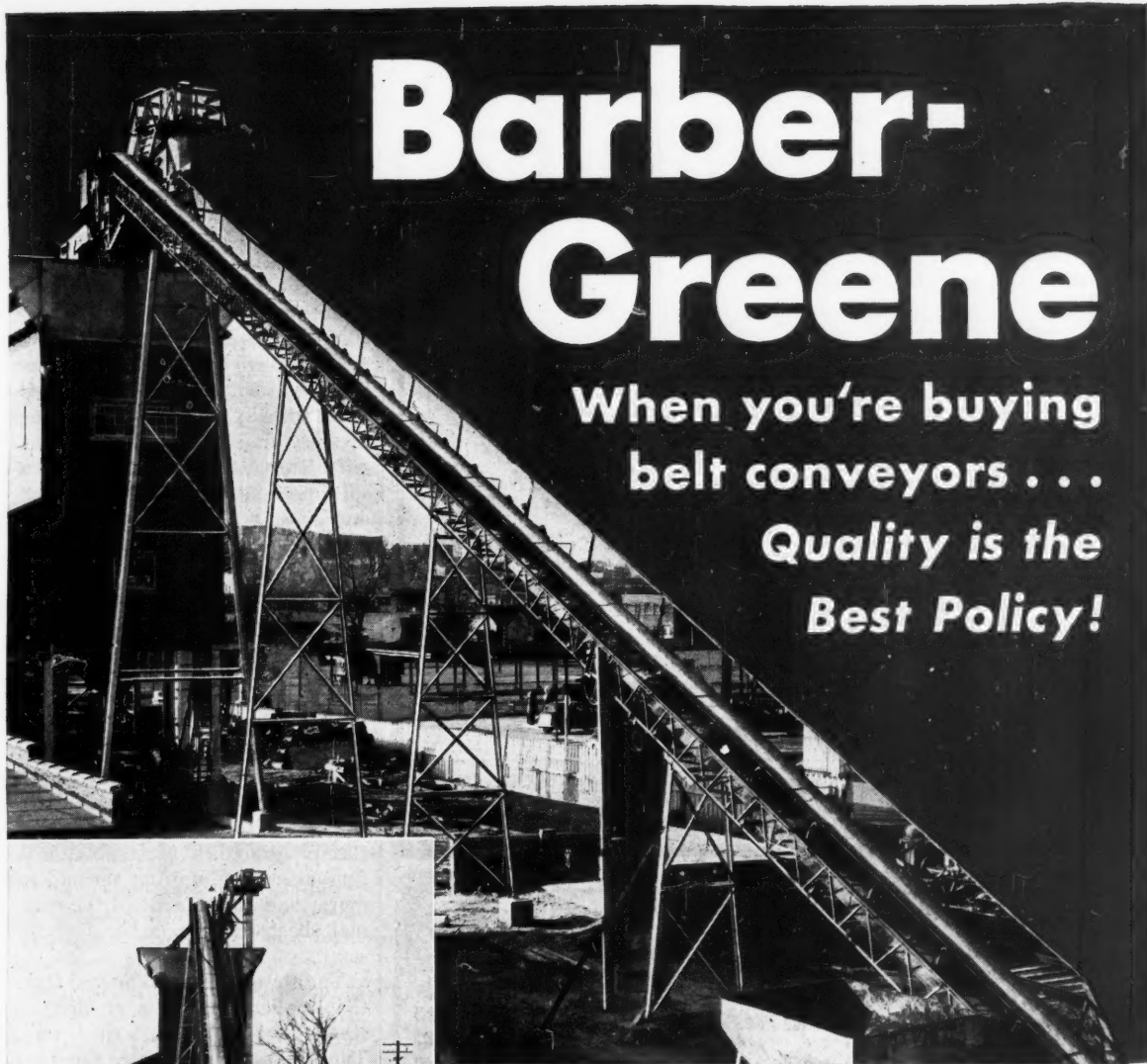
Material handling engineers will appreciate that some "bugs" are apt to appear in such an innovation as this one. One is the present cost of manufacturing the containers, with upkeep difficulties forming a second factor in this respect. In time, mass-production may reduce the high manufacturing cost. And the present maintenance difficulties may be overcome with more experience and better trained supervision.

The monorails took to the air with the inauguration of the first several Mainliner 300's about the middle of March. While we are still working on the two problems mentioned, the equipment is now standard on all transcontinental DC-6's.

Barber-Greene

When you're buying
belt conveyors . . .

**Quality is the
Best Policy!**



Belt Conveyors by Barber-Greene are examples of infinite attention to engineering detail. You see this from the minute they arrive: the plainly numbered carriers and support members, the easily followed erection print, the simplified assembly on the job that comes from their standardized design. The units themselves—carriers, trusses, walkways, drives and takeups—go still further in proving the value of belt conveyors that are quality engineered. They are designed to last through longer years of service. And they do just that—while moving bulk materials at a high production pace at a low cost per yard moved.

53

This B-G Belt Conveyor set-up makes efficient use of limited space: materials dumped into pits below tracks are carried to plant adjacent to spur.



BARBER-GREENE COMPANY • AURORA, ILLINOIS

Constant Flow Equipment



LOADERS



PERMANENT CONVEYORS



PORTABLE CONVEYORS



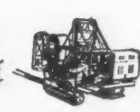
COAL MACHINES



BITUMINOUS PLANTS



FINISHERS



DITCHERS

**THE SKY'S THE
LIMIT — OR
NEARLY SO
WITH RACKS
ARRANGED FOR
EASY STACKING!**



We specialize in the manufacture of storage and tiering racks, pallets, conveyor baskets, wheeled racks, etc. made to solve the customer's individual material handling problems.

Illustrated above is a typical rack of square tubular steel. Combining light weight with adequate strength, a rack of this type is ideal for users of fork trucks and those wishing to stack racked material high in storage areas.

Our engineering department is always available for assistance in the design of equipment. Tell us your needs. No obligation, of course.

VARIOUS TYPES
OF TIERING
DEVICES USED



HALF CUP



PIN



CHANNEL



CUP

PERKINS BRIDGE & SUPPLY CO.
FLUSHING, MICHIGAN

HARDWOOD — STEEL — ALUMINUM

HARDWOOD — STEEL — ALUMINUM

Let Us Supply You
with

THE RIGHT PALLET

for your job

at the Right Place — at the Right Time

Pallets Made of Hardwood —
Steel Aluminum

**MAGNESIUM ALLOY DOCKBOARDS
L C L PALLET BOXES**

Learn the economy of a rental program for the
entire materials handling system and how it can
be arranged.

Mill connections in Ohio, Pennsylvania,
New York, Virginia, Georgia and
Arkansas.

PALLET SYSTEMS, INC.

GUARDIAN BUILDING
CLEVELAND 14, OHIO

WIRE
OR
WRITE
FOR
FURTHER
INFORMATION

MOVING OUTSIDE? . . .

(Continued from page 36)

ton presses, a considerable portion of each sheet remains. Rather than discard it as scrap (upwards of 30 to 40 per cent of the sheet may remain) the company engineered a departmental layout which reduces scrap to a minimum. To understand this layout, it is necessary to review briefly the floor layout of this department. It is bisected longitudinally by a track. The big presses are located toward the north end of the room, one on each side of the track. Along the east and west walls are two 20-inch roller conveyors which extend from the presses to the south end of the building.

Scrap utilization is effected by means of small punch presses located along the conveyors. These punch smaller components from the sheet steel left over after primary stamping. This material is placed on the conveyors by the primary press operators and is moved down the line, with progressively smaller stampings made at each subsequent press operation, until at the end no more than 15 per cent of the original sheet remains in the form of scrap.

The stampings are removed from the smaller presses in corrugated steel skid bins by platform trucks. The residual scrap is also removed in this manner.

Plan Department Expansion

At present the company is planning an expansion of its press facilities through the use of a building adjoining the press department. This area will be served by track from the pickling room, so that sheet can be moved on the roller-top cars to conveyORIZED work tables similar to those previously described. Scrap material will be utilized by secondary presses as at present. Company engineers, however, plan a further handling refinement to move residual scrap from both departments with greater economy.

Since the new section of the press room is located immediately adjacent to a spur, the engineers are developing an arrangement involving the use of a skip hoist conveyor

with a hopper and chute, which will dump the scrap directly into gondolas on the adjacent spur. As scrap amounts to roughly a carload per day, this means of handling is expected to be very effective. This method will reduce truck travel from 300 feet to a little more than 70 feet per load hauled.

NEW PRODUCTS . . .

(Continued from page 57)

steel roller chains on one-foot centers, assure minimum amount of product "roll-back", the company states. Features claimed by the manufacturer are: electric motor or gasoline engine drives, capacity of 60 tons per hour of 50 pounds per cubic foot material, maximum discharge height 10 feet, minimum discharge height four feet, speed 100 feet per minute. The overall frame width is 13¾ inches. The conveyor is mounted on a combination trailer and hydraulic lifting device for moving from one job to another and for adjustment of the conveyor angle.

HYDRAULIC FLOW REGULATOR

NP92—The Waterman Engineering Company announces the development of an automatic flow regulator for hydraulic systems where unlimited flow in one direction is required, with a predetermined rate of flow in the opposite direction.

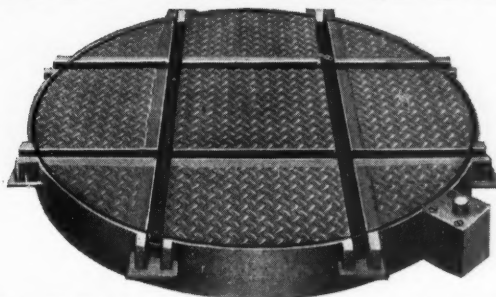


With this regulator, the release states, hydraulic machine tools and lift trucks can be controlled to predetermined speeds and insured against the sudden release of hydraulic pressure. A descriptive circular on this equipment is available upon request.

ADJUSTABLE GRAB

NP93—Mansaver Industries, Inc., has developed an adjustable type grab for handling boxes. The accompanying photo shows that this grab is designed so that it requires only a minimum of space between containers—just enough to pass the hooks over the load. With this

CHASE electric welded steel TURNABLES



Style 227 Checker top with grooved cross rails and locking device.

ANY SIZE OR CAPACITY UP TO 10 TONS

30 DAY DELIVERY

For fast low cost turning, use Chase Electric Welded Steel Turntables. Send your specifications for our quotation. No obligation.

- 30 day delivery now available—
- Choice of plain or checker top with raised rails or grooved rails.

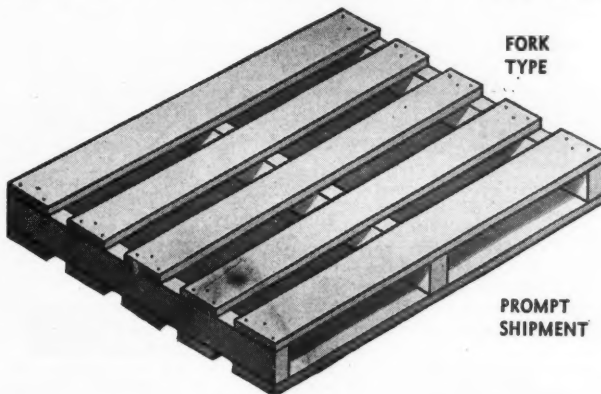
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FORK TYPE

PROMPT SHIPMENT

IPCO pallets are sturdy . . . of sound mixed unseasoned hardwoods constructed with cement coated drive-screws, hand-driven. The Stevedore type pallets are constructed with carriage bolts that have the nuts countersunk. IPCO pallets stand up under the most rigorous service. Write or telephone for quotations.



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Long life and low maintenance cost spell real economy in pallet purchasing

Good workmanship and selected hardwoods guarantee quality pallets.

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TOWSLEY TRUCKS, INC.

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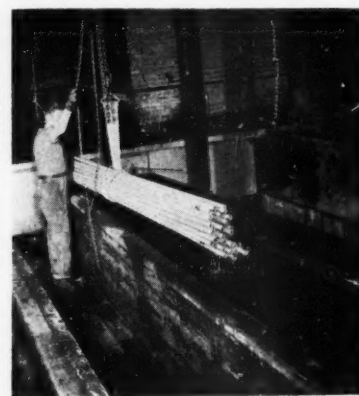
grab, the manufacturer points out, it is not necessary to get a hoist



with a chain of a special length, where the hoist has to be hung higher than eight feet. This is the standard length of chain that comes with the usual hand hoist. In such cases, the extra height is compensated for by use of the extension hook shown, which is threaded over the hoist hook. This type of grab is recommended for shipping areas with limited floor space where every square foot is utilized for material.

WIRE MESH SLING

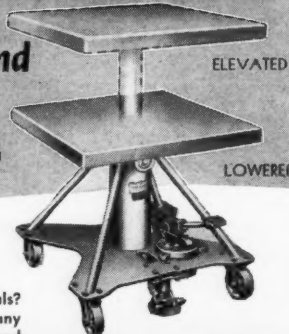
NP94—Improved efficiency in handling tubing, rounds and bars in pickling operations is promised with a new sling developed by the Cambridge Wire Cloth Co. Made in a patented mesh construction, it is designed to handle steel and



alloy tubing in a soft firm grip, with little danger of wall collapse, or damage to fine-finished materials. Constructed to carry as much as five tons of material, the sling is available in Menel or Inconel nickel-alloy finishes. According to the release, it can be placed around the materials and hooked in the hoist in one operation.

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To Many LIFTING Problems**

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PORTABLE
HYDRAULIC
ELEVATING
TABLE



Worried about costs? Speed? Safety? Damage?—and other factors in handling materials? Then look into these many jobs this handy Lyon-Raymond Elevating Table is designed to do.

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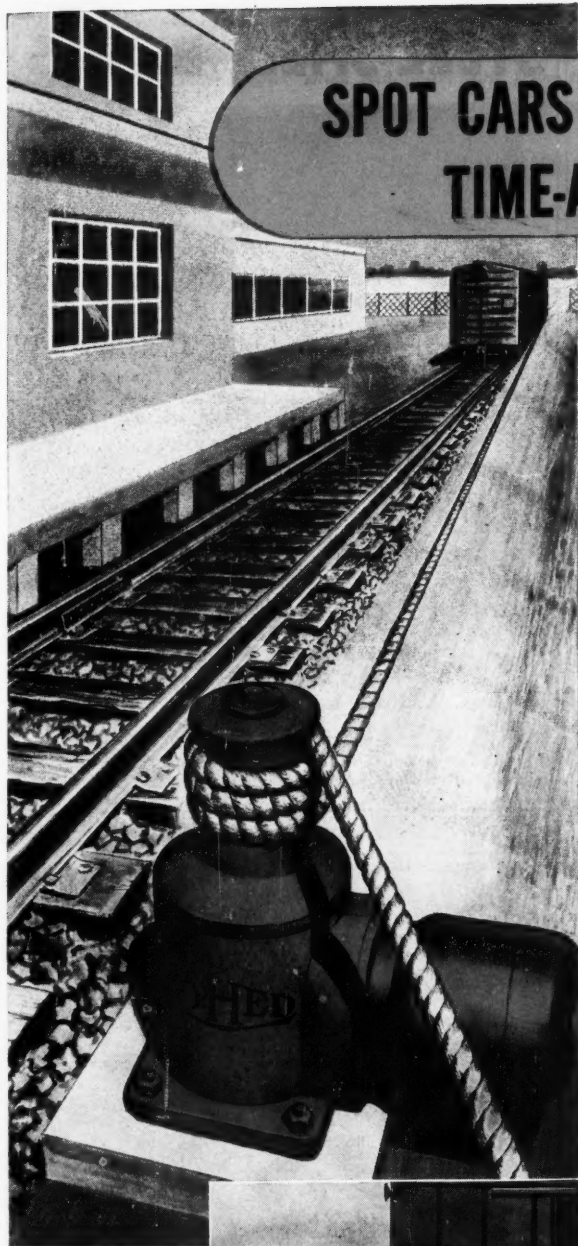
We have prepared an illustrated bulletin full of suggestions that methods engineers will find most helpful. It's free! Write for your copy today!



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Any plant with a railroad siding, and moving a normal amount of freight, can eliminate this hazard and economize in several ways with a sturdy Lo-Hed Car Puller. Waiting for a shifting engine is over. Loading and unloading is speeded, demurrage reduced and shifting charges avoided.

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SHELF BOX**

"BAY" shelf boxes furnish an excellent method of storing bolts, nuts and other small parts. Straight sides allow for compact arrangement and maximum use of storage space. Because of their smooth surfaces, these boxes can be removed or shifted with very little effort. Label holder on the front of each box makes identification of contents easy, greatly speeding material handling. Handle on front only. Boxes are furnished in baked green finish.

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They are recommended for paint, chemical, pickling processes; for potentially explosive and other hazardous conditions; also for a wide variety of normal applications.

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A black and white photograph of a large industrial machine, likely a shear or guillotine, in a factory setting. The machine has a heavy metal frame and a large, dark, rectangular cutting head. It is positioned on a concrete floor, and various industrial structures and equipment are visible in the background.

A black and white photograph of a large, intricate mechanical device, likely a steam-powered engine or pump, mounted on a wooden platform. The machine features multiple cylinders, a large flywheel, and various pipes and structural supports. A person is visible in the background, and another person is partially visible on the right side of the frame. The scene is set outdoors, possibly at a fair or exhibition.

WHEN you use C-F Sheet Lifters to load, carry and unload loose or bundled sheets in and out of storage, you keep no machine or operator idle, waiting for material.

C-F Lifters provide a faster, safer and more economical method of handling sheet stock because they carry more sheets per load, have a tong action that grips loads tightly, preventing stock slippage or sag, yet design features such as wide bearing surfaces give full protection to stock edges. One man end or remote cab control keeps operator away from sides—stock can be loaded or unloaded in close quarters with resulting savings in storage room.

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Chicago 23, Ill.

THE ease with which this bar tong and hoist arrangement handles heavy plate steel makes a routine job of an otherwise awkward job. This single 1-ton hoist and its bar tong serves eight machines in a parallel battery arrangement.



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● You, too, can increase the efficiency of your plant with adequate skid and semi-live skid facilities engineered to handle your particular problems. Write for information, today. Illustrated literature on request.

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Materials Handling Division

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The hoist, by running parallel to the machines (at an angle to the building bay), gives the operator a wide range of positions to choose from in maneuvering materials at machine locations, while by mounting the transverse rail as illustrated, one operator may readily service the whole battery of machines using a single hoist.

Arrangements similar to that shown in this machine shop might be employed in assembly operations, in warehouses, in shipping divisions as well as in production bays.—Courtesy The Yale & Towne Mfg. Co., Philadelphia.

CUTTING OPERATING COSTS

THE California Warehouse, Los Angeles, handled 46,000,000 pounds of merchandise across its floor in 1946, which means that the goods were hauled for a considerable number of miles over the 130,000 square feet of the plant. Rising labor costs coupled with rapid government withdrawals of stored goods has made reduction of material handling costs an absolute necessity, according to President W. E. Fessenden.



In preparing for the postwar competitive period, his company in 1942 was the first warehouse in Los Angeles to equip with a fleet of powered platform trucks. Of the type shown in the accompanying photo, these trucks move loads up to 4,000 pounds on hauls from 40 to 300 feet from storage to loading docks. The equipment is also used in moving goods from incoming highway vehicles and in runs up to 1,000 feet from ship to truck at the Los Angeles Harbor.

With the warehouse capacity curve decline today because of the withdrawal of U. S. supplies, his company has consistently tried to pare all operating costs, said Fessenden.

Courtesy Salsbury Motors, Inc., Pomona, Cal.

JULY, 1947

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Camp's No. 7 is applied like cement over your present wood or concrete floors. A 1/4 inch thickness resurfaces worn or rough concrete floors to withstand any traffic. Sets in three or four hours—ready for heavy trucking in 24 to 48 hours. Camp's No. 7 comes ready to mix—nothing else needed. Your choice of brown, red and natural dark gray.

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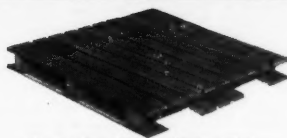
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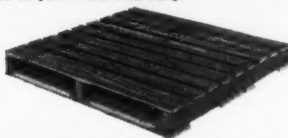


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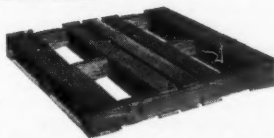
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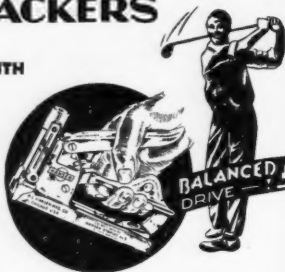
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PHONE L. D.

HANSEN TACKERS

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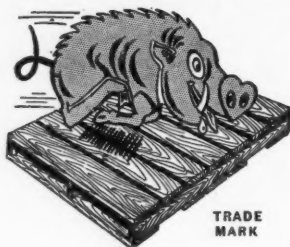
NO doubt about it—the Balanced Drive of Hansen Tackers puts them out in front for easy-gripping, fast-driving one-hand action. Gets you out of many tight spots when extra speed is required.

With its zip-zip-zip action, the Hansen Tacker fastens labels on boxes, lines shipping cases with corrugated or water-proof paper or protective felt.

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PATRON TRANSMISSION CO., has appointed the following material handling concerns as distributors for Mercury Pre-fabricated Conveyors: Rapids Handling Equipment Co., Columbia, S.C., and Atlanta, Ga.; Nook and O'Neill Inc., Cleveland, Ohio; Grady W. Jones, Memphis, Tenn.; Industrial Equipment Co., San Antonio, Texas; Freeman Industrial Service, Providence, R.I.; C. G. Forshey, Houston, Texas; E. D. Farrell Company, Buffalo, New York; Coldwell & Co., Terre Haute, Ind.; B. C. Wendt, Rochester, New York, and Mr. Stanley T. Smith, Albany, New York.

OHIO EQUIPMENT COMPANY, INC., Cleveland: James Cunningham joined the company as Service Manager. He is in complete charge of the recently expanded service and parts department. As part of its expansion plans, Ohio Equipment has also added a complete line of power operated conveyor boosters made by Materials Movement Industries.

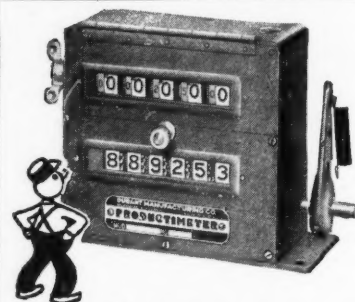
The company also added recently to its staff Charles F. Yarham. He is a licensed engineer and specialist in the application of handling equipment to heavy construction industries. Yarham comes from the Euclid Road Machinery Co., Cleveland, where he has carried out purchasing and application-engineering responsibilities for some years. His territory will be Cleveland and suburbs, west of the Cuyahoga River, and such industrial centers as Lorain and Sandusky. He will specialize in electric trucks, mobile cranes, hoists, scales, and intra-plant and skid-and-pallet systems.

PRODUCTION EQUIPMENT COMPANY, Meriden, Conn.: Peter M. Saxman was recently added to the sales engineering staff. He has had seven years of experience selling Connecticut industries and is well trained to be a material handling engineer. The company was also made an agent for the Barrett-Cravens Co., Chicago.

R. R. SCOTT, Indianapolis, Indiana, has been appointed direct factory sales representative and field engineer with the Rapids-Standard Co. Scott was formerly with the Ellis-Scott Company.

G. N. CRAWFORD EQUIPMENT COMPANY, Pittsburgh: John C. Hammond will take up duties as a representative to cover the eastern part of Western Pennsylvania. Phillip Marsh will cover the northern area with headquarters in Erie. The sales staff now consists of Parker Cott, central; Robert S. Sealy, northeastern, and Robert F. Johnston, southern section.

COLSON-MERRIAM CO. has been appointed distributor for the Aerol Co., manufacturers of wheel casters and trucks. Sales will be handled in all branches from Maine to Florida with a warehouse located in Baltimore, Maryland. The Philadelphia, Baltimore and Washington offices of Colson-Merriam have been made representatives of the Tipp Cable Conveyor Co.



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NEW design of double deck Model "N" units offers smooth action and high speeds . . . both rows count simultaneously.

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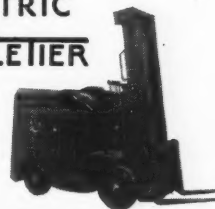
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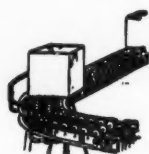
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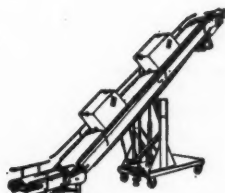
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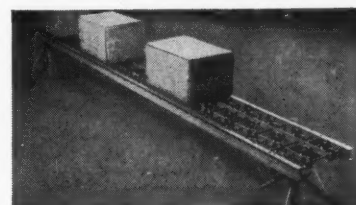
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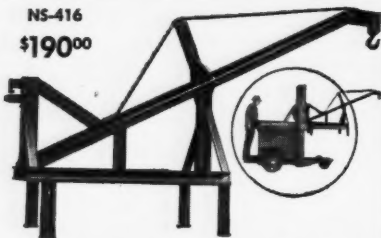
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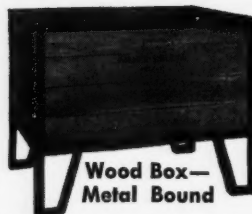
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For general utility use. Hardwood box, completely metal bound. Has four way lift truck entrance (side or ends). Give underneath clearance required for your lift truck.

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\$2915

34" wide,
42" long,
20" deep

NS-249B
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48" long,
24" deep

NS-364
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Sheet Steel Grab

Handles sheet steel bundles up to 9" thick, 18" x 48" wide, any length—without slippage, distortion or damage to stock. Grabs used single, double or triple—capacity 1 ton per grab—total 3 tons. Supporting beam 6' long. Wt. 190 lbs.



B-465B
(Weight 407 lbs.)
\$5750

B-465Y Dump Box Yoke \$4500

Automatic Dump Box

Designed for carrying and dumping of materials or parts—used with any hand or power lift or fork truck, also overhead hoist. Heavy gauge steel, reinforced.



B-727

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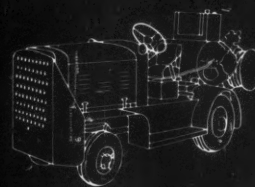
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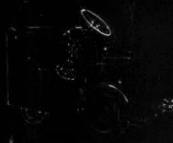
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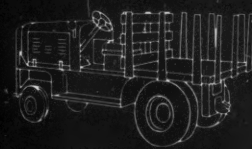
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